AMIGA WORLD

November 1987
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Publication

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Buyer's Guide

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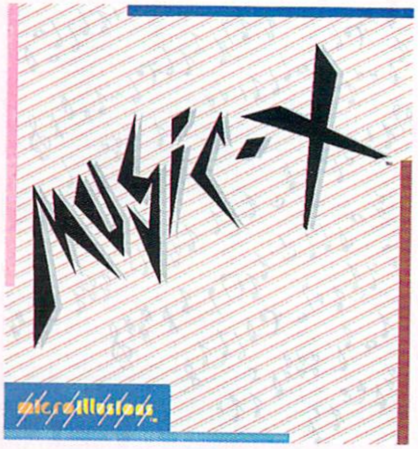
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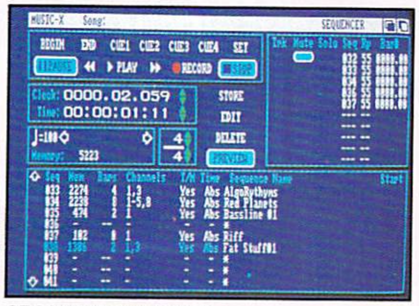
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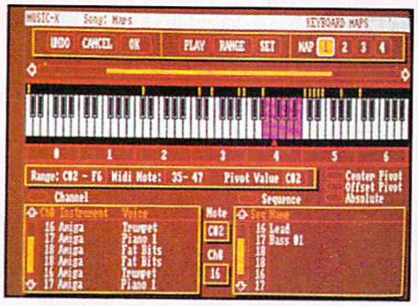
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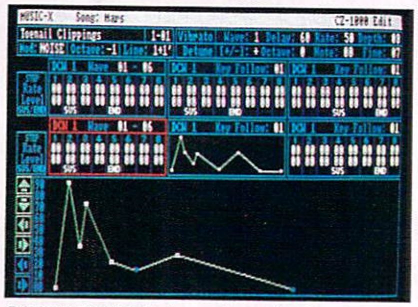
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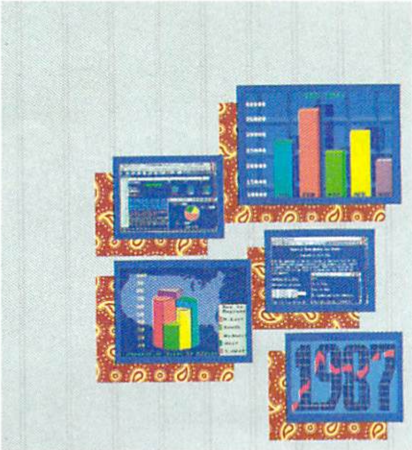
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COVER ILLUSTRATION BY DANIEL PELAVIN

The Amiga isn't just another "business machine" (who wants more IBM-alikes?), but it's more than powerful enough to handle any business application. And now the Amiga business software market is finally building up steam (see our Buyer's Guide). Also, many small enterprises find that Amigas can do a lot more than just keep the books . . .

November 1987

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VOLUME 3, NUMBER 6

AmigaWorld (ISSN 0883-2390) is an independent journal not connected with Commodore Business Machines, Inc. *AmigaWorld* is published monthly by CW Communications/Peterborough, Inc., 80 Elm Street, Peterborough, NH 03458. U.S. subscription rate is $24.97, one year; Canada $47.97 (Canadian funds), one year only; Mexico $29.97 (U.S. funds drawn on U.S. bank), one year only; Foreign $44.97 (U.S. funds drawn on U.S. Bank), one year only, foreign Airmail $79.97 (U.S. funds drawn on U.S. bank). Second class postage paid at Peterborough, NH, and at additional mailing offices. Phone: 603-924-9471. Entire contents copyright 1987 by CW Communications/Peterborough, Inc. No part of this publication may be printed or otherwise reproduced without written permission from the publisher. POSTMASTER: Send address changes to *AmigaWorld*, Subscription Services, PO Box 868, Farmingdale, NY 11735. Nationally distributed by International Circulation Distributors. *AmigaWorld* makes every effort to assure the accuracy of articles, listing and circuits published in the magazine. *AmigaWorld* assumes no responsibility for damages due to errors or omissions.

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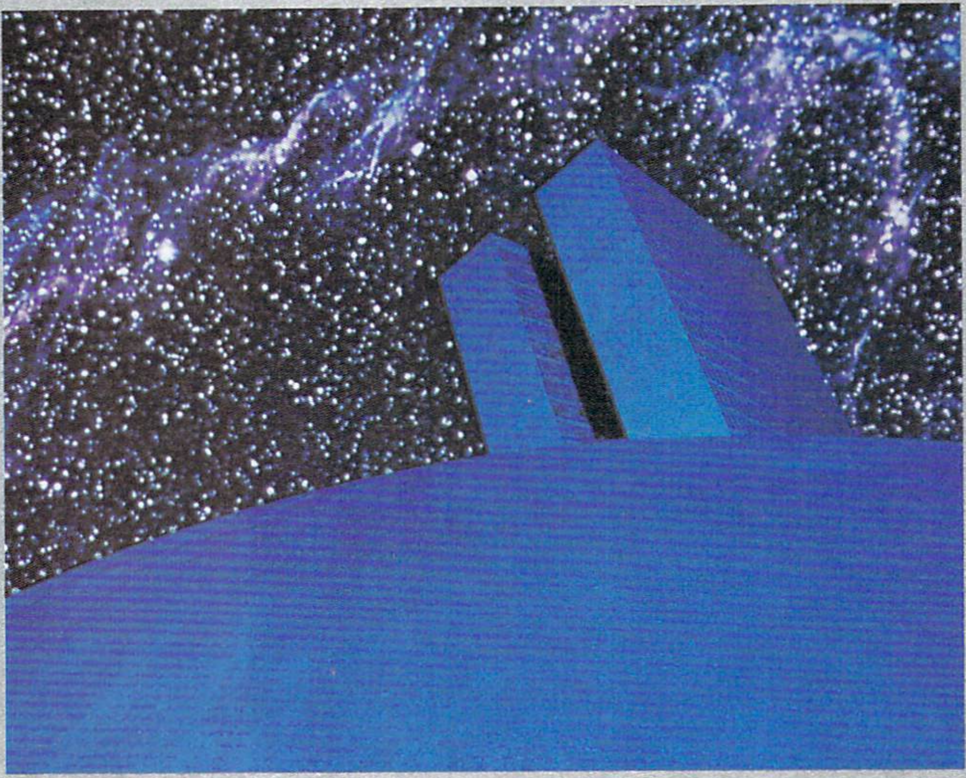
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Zeitgeist

AmigaWorld *gets down to business . . .*

amongst other things.

By Guy Wright

BUSINESS IS THE theme, more or less. If you are looking for 100 tips on running your business with an Amiga, 42 ways to do double-entry bookkeeping on an Amiga and 16 sure-fire ways to improve productivity with your Amiga, then you are just not going to find all that in this issue. If you are curious about some of the ways that other people have integrated Amigas into their businesses, then we have a few offerings.

It is hard to pin down anything beyond the obvious when it comes to Amigas and business. By that I mean when someone is using an Amiga to keep their books, or print their payroll checks, or handle their word processing, then it is fairly clear what the connection is. However, it isn't great magazine material. (I can't imagine thousands of people getting all worked up about an article outlining the pros and cons of loan amortization programs in real-estate offices.) The interesting material comes out when you ask someone if they use their Amiga at work and they answer "No, but. . .well, I put together a video for a presentation a while back" or "I digitized everyone's faces for T-shirts" or "I do color graphs for reports," etc. Those are the kinds of stories about Amigas in business that are interesting to hear about, even if you just use your Amiga at home to play Earl Weaver Baseball.

And speaking of baseball, the Red Sox finally won the 1986 World Series last week. As you will see in this issue, some of the staff spent more time cursing umpires, running out to the mound and changing lineups than they did slaving over their word processors (I was on vacation for a few days and they made the most of it while I was gone).

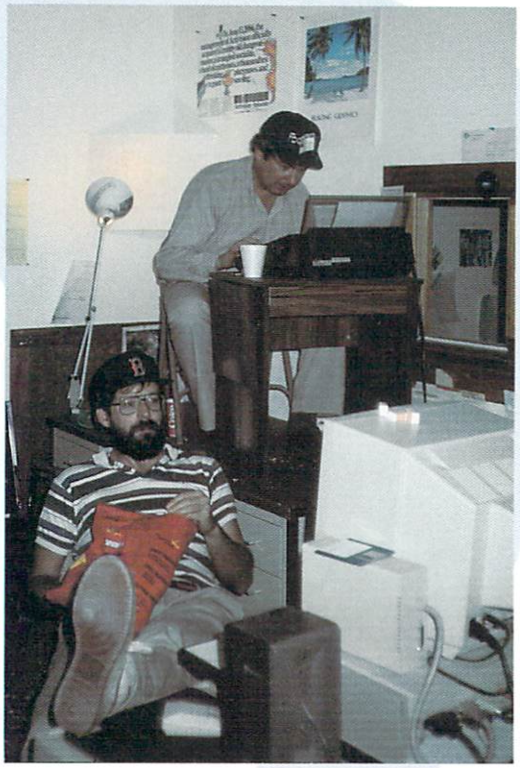
"It was a scientific research thingie" claims our review editor. "We had to, like, build the AmigaWorld Stadium, draft teams and really give the program a workout to see if it met all the, uh. . .requirements."

There is a *lot* of baseball in this issue.

Status report. The *AmigaWorld* Public Domain Library is shaping up and should be ready for launch pretty soon. We could still use any and all contributions. We are getting lots of hints and tips for the Hors d'oeuvres column. . .keep them coming. We could use a few more letters to the Repartee column, just to let us know how we are doing. Is *AmigaWorld* getting better? Worse? About the same? Are the articles valuable, too complex, too simple, well written, poorly written? Is the review section accurate, reliable, too hard on products, too soft on products, believable, biased, too long, too short? What do you think? When was the last time you wrote a letter to a magazine saying that you thought they were doing a good job? Take two minutes to jot a note on the back of a rock and mail it in to us. If enough of you write in, then we can finish the west wing by the summer. If you all say wonderful things about the magazine, then we can sleep a little easier at night knowing that we are, in our own small way, making life a little brighter for Amiga owners everywhere. Which would be great. If you all say terrible things about the magazine, then we will have nightmares, let our hair go wild, start eating bugs, and begin to question our purpose in life. Which would be a terrible shame considering the mammoth amount of raw, creative energy we have around here.

So it is up to you and your conscience.

Have a good read. ■



Red Sox manager Ryan takes seventh-inning munch while "Red" Sullivan pounds out the story of how the Sox finally won the 1986 World Series over Earl Weaver's Mets.

PHOTOGRAPHED BY NANCY POTTER THOMPSON

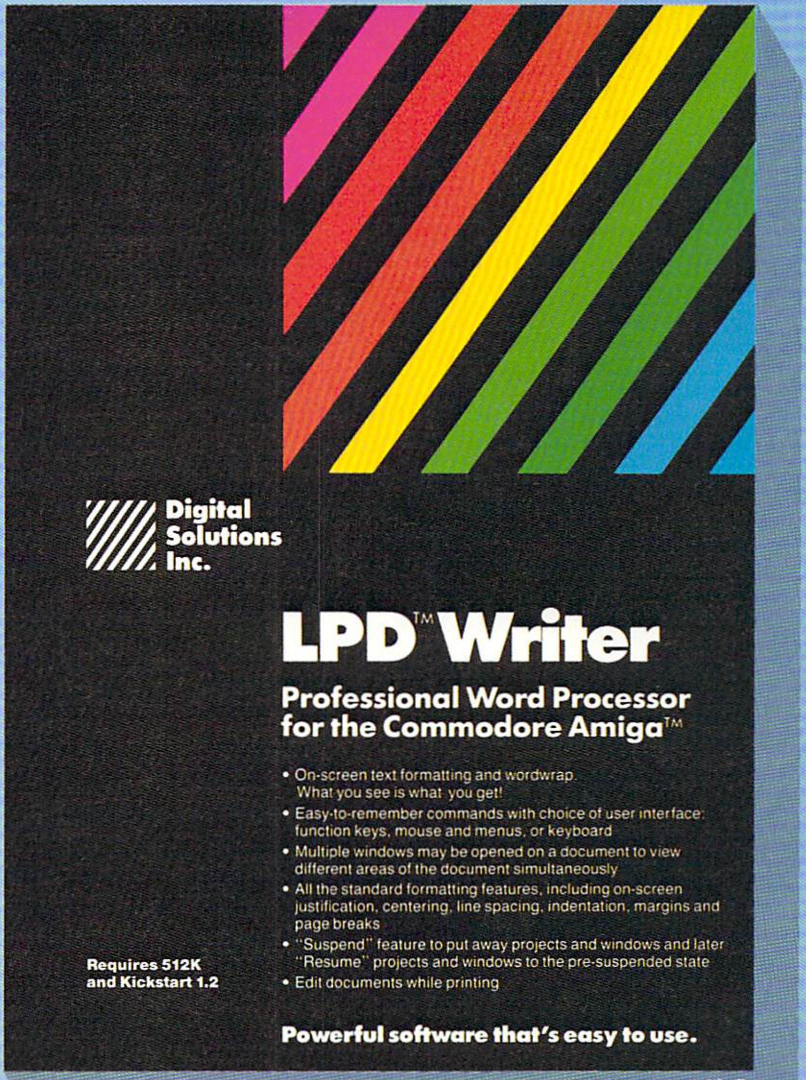
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Repartee

Pleased Programmer

I have been subscribing to AmigaWorld since the publication of its premiere issue. Most of the issues, however, left me feeling empty. They did not have information useful to me as a programmer.

The Special Issue and the July/August '87 issue were exceptions. They were immensely useful. The article on the operating system kernel, Exec, helped me understand its operation in detail. The AmigaDOS reference guide lets me find command formats quickly and easily. I had been waiting for an article on the audio device ever since I bought my Amiga two years ago. The article gave me enough information to write a note editor almost as powerful as the original Musicraft.

These two issues were the best since the magazine began publication. I hope that your future issues will continue to include articles for the programmers who want to understand how their machine works.

Jose Aaron Gonzalez
San Diego, CA

Sinking Simulation

I recently purchased a copy of Silent Service, a submarine simulation game from MicroProse Software, Inc. (See review in this issue, p. xx.)

I enjoyed the game very much. However, I used the program for about two days before it started to gradually fail, locking me out of one area at a time until I couldn't load it at all. I returned the defective disk as per the warranty instructions. When I finally got my new disk, it lasted about three hours on the day I got it. The next day, it began to lock up or kick me back out of the program.

I suspect that the problem is in the program's copy protection. Of course, MicroProse will sell you a backup copy for $10. But, this copy is also protected and, if I am right, just as defective. Although I like the program very much, I would not recommend it to your readers, unless of course they want a program that they can use only a couple of hours a month.

Jack Sharkey
Anaheim, CA

MicroProse has recently released an upgrade to Silent Service that should take care of the problems. Contact them for information about any upgrade policy they may be offering.
—Editors

1000 Uncertainties

I've owned an Amiga 1000 since October of last year, and being a graduate student, it certainly made my life easier. Reading your article in the May/June issue of AmigaWorld ["Bringing It All Back Home: The Amiga 500," p. 27] makes me feel uncertain about the future of hardware peripherals for the Amiga 1000. Mr. Ryan stated that the 500 was "functionally equivalent" to the 1000. If this is truly the case, then the 1000 does not have a forseeable future as an "in demand" machine. Since I am on a limited budget, I cannot go out and buy the extra memory that I would like to have, nor can I afford to upgrade to a 2000. Will I be stuck with a machine that will be unexpandable before long?

Commodore is to be praised for its innovative Amiga line, but they are also to be criticized for not having the foresight to engineer the new Amiga models, especially the 500, to be able to support hardware already developed or being developed for the 1000.

Terry E. Osborne
Tuscaloosa, AL

I think Commodore has just made a mistake in their redoing of the Amiga, the new A2000. Granted, they made some nice improvements (e.g., internal disks, expansion slots, clock/calendar), but why the hell did they change the Zorro slot? I also cannot understand why they put the Workbench into ROM. If you look at the changes made to Workbench since it came out, I am sure there will be more changes to it in the future. I myself would rather have the upgrade on a fresh new disk than to do a ROM patch. Also, if I wanted something to be as slow as the IBM PC, I would have bought the damned thing to start with.

Robert R. Donlon
Cohoes, NY

Thank you for the opportunity to vent my frustration along with the other Amiga 1000 owners who will undoubtedly fill your mailbox with letters of disbelief. I'm referring to the absurd decision by the folks at Commodore who introduced not only one, but two new machines that preclude expansion hardware that is common to all three Amigas!

In "Back in Front. . .Amiga Again" [March/April '87, p. 17], Bob Ryan reported that "devices that connect to the expansion bus on the A1000 can't connect to the Amiga 2000" and that "the [86-pin expansion] bus comes out of the left side of the A500 and out of the right side of the A1000."

I took a big gamble on Commodore—Amiga monitors were not available, and I used a TV with an RF modulator for six months until Amiga monitor production caught up to the demand. I assumed there would be product improvements, but I never suspected that Commodore would market upgraded models so soon that would be incompatible with the A1000 in such a significant area as RAM expansion.

The Amiga 1000 is the most capable machine in its price range. Unfortunately, hardware is not the only criteria to consider before you purchase an Amiga. Think about the company you will be dealing with and their disregard for their customers!

Chip Frazier
Bellevue, NE

The above is a sampling of letters that we have received from frustrated and bewildered 1000 owners. In an effort to present all sides of the story, we would like to hear from other 1000 owners as well as those of you who have already purchased either the 500 or the 2000. What are your impressions of your machine? Is it living up to your expectations? What about your experiences with Commodore (i.e., customer support)? Let's hear from you!
—Editors

Send your letters to: Repartee, *AmigaWorld* editorial, 80 Elm St., Peterborough, NH 03458. Letters may be edited for space and clarity.■

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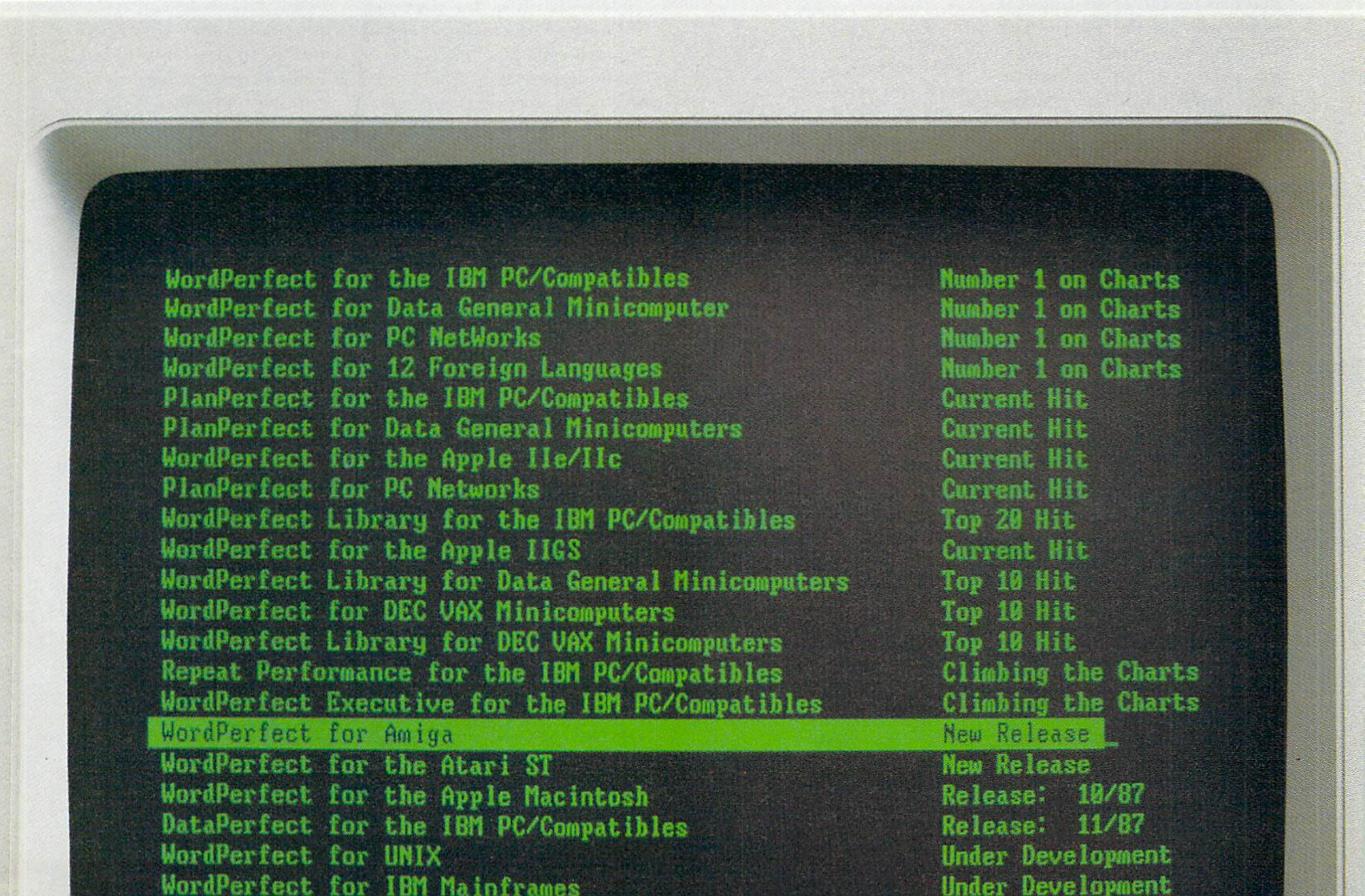
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LIVE! Lives!

If it weren't for the fact that a lot of people have invested a lot of time and money in the product, and that a lot more have eagerly awaited its arrival, the trials and tribulations of **LIVE!**, the real-time video digitizer from A-Squared Distributions Inc., would be a pretty funny story. Although prototypes have existed for over two years, LIVE! has been caught in a long series of false starts and delays that had people wondering if it would ever see the light of day. Well, the sun isn't up yet, but that pale glow on the eastern horizon just might be the morning twilight.

Like so many other priorities, LIVE! got lost in the shuffle of the many shakeups and layoffs that have plagued Commodore since the introduction of the Amiga. Originally licensed to Commodore in January 1986, LIVE!'s progress to market was alternately a burning priority and a back-burner project, depending upon the emphasis of the current management team and the workload of Commodore's engineers. Finally, earlier this year, A-Squared negotiated a release from its agreement with Commodore and announced its intention to market the product itself.

Although there were plans to change the name of the company to Grab Inc., A-Squared is sticking with its original name. It also plans to have LIVE! on the market in October of this year. As Wendie Petersen told me in a phone interview, "it's an incredible relief to have things under your control." Initially, A-Squared plans to sell Live! direct to customers for $295. As the ball gets rolling, it plans to build a dealer network to carry the product.

—RR

Come Together

North of the border, Commodore Canada is sponsoring the Fourth Annual World of Commodore Show on December 3–6. The show will feature both Amiga and C-64/128 exhibitors and speakers, and will be held at the International Centre, 6900 Airport Rd., Mississauga, Ontario, Canada. For more information, contact John Milne at 416/928-2112 or Kathy Dimopoulos at Commodore Business Machines Ltd. (416/499-4292).

—RR

Showy Graphics

With 30,000 attendees, SIGGRAPH is the biggest computer graphics show in the country. This year, people packed the Anaheim Convention Center to catch up on the latest developments in digital design at the 14th annual SIGGRAPH conference. Sponsored by the Association for Computing Machinery and an arm of the IEEE, SIGGRAPH is *the* trade show to see and be seen at, graphically speaking. And although SIGGRAPH is traditionally the showcase for high-end professional workstations, the lowly (by cost comparison) Amiga made quite a splash.

Pixel-freaks, many of whom had never seen an Amiga before, packed Commodore's exhibit area where a score of Amiga 2000 workstations brought to life the latest creations of Byte by Byte (the **Sculpt 3-D** ray-tracing program), Aegis Development (**VideoScape 3-D** and **Video Titler**), Ameristar (networking a couple of Amigas to a Sun workstation) and ACS (showing its **E/FX** storyboard software). Other highlights included MicroIllusions' preview of **Photon Video**, its new animation software, and NewTek's smashing parody of you-know-who called **Maxine Headroom** done with animated DigiView images. Around the corner, Mimetics demonstrated its new genlock and frame-grabber while the University of Lowell (MA) showed a snazzy 35-MIPS pipeline-style signal processing card that boosts Amiga output to broadcast-quality standards. In another part of the booth, the Right Answers Group previewed **The Director**, a script-based animation package.

Evening excitement included a marathon Amiga Friends User Group meeting that attracted over 500 people to the ballroom of a nearby hotel, and a more intimate gathering hosted by several Amiga developers and Dale Luck, inimitable Commodore/Amiga engineer. These activities competed with the highlight of the conference, SIGGRAPH's renowned and always sold-out **Film and Video Show** (presented in a huge auditorium on three successive nights), where 54 of the most creative animations I've ever seen were screened. Although my favorite was Disney's **Oilspot and Lipstick** (a couple of dogs created with spare-parts resolve conflicts at their garbage-dump home), the winner was Pixar's **Red's Dream**, featuring a rainy-night performance by a lonely unicycle. A portion of Red's Dream quickly reproduced on the Amiga by a favorite Amiga graphics programmer delighted viewers at the developers' reception and on the exhibit floor until Pixar (who introduced a "low-cost" computer graphics workstation at SIGGRAPH for only $49,000) objected. Graphic junkies should note that SIGGRAPH '88 will be held August 1–6 in Atlanta, where you can expect the Amiga to make an even bigger splash in the world of DEC, Apollo and Sun.

—Peggy Herrington

Random Access

The rumors floated at last Spring's COMDEX about a policy allowing Amiga 1000 owners to get a discount when upgrading to the A2000 have come to earth. Commodore will *not* offer a discount to A1000 owners upgrading to a 2000.

SYSOPs beware! *AmigaWorld* contributing editor Peggy Herrington has received reports of a destructive program lurking on some Amiga BBSs. Called STEMMY.ARC or ST.EMMY.ARC, the program erases the disk you execute it from. ■

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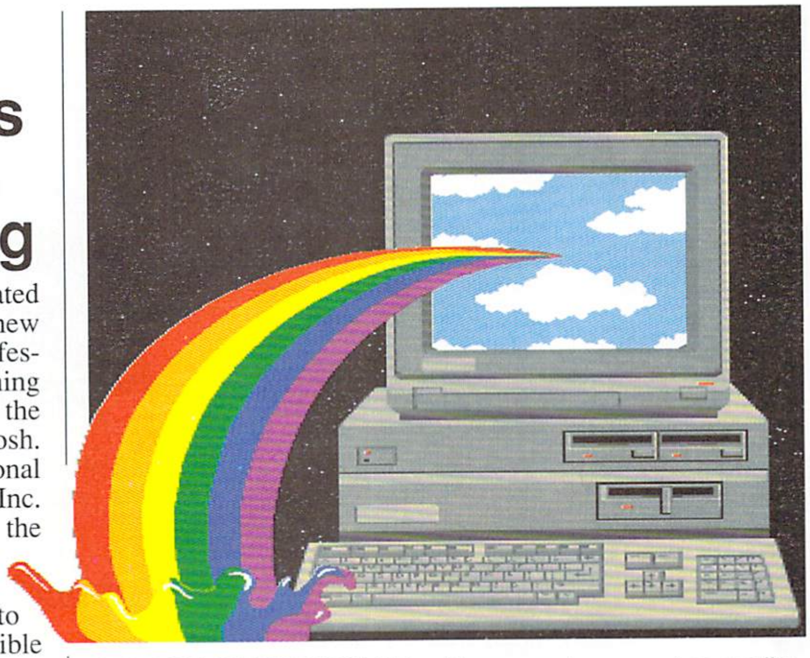
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Hors d'oeuvres

Hints, tips and techniques from your fellow Amiga users.

Copy Tabs to PRT

I usually print files by COPYing them to the AmigaDOS PRT: device from the CLI. Very often the file I'm printing will have tab characters in it, but when I COPY the file to PRT:, the tab characters are ignored. I finally came up with the following technique that can be applied to more than just setting tab stops.

First of all, you need to set up a special file on your disk. At the CLI prompt, enter the command:

COPY * to S:SetTabs

and then type the following four characters without pressing the return key:

<ESC> # 5 <CTRL>\

That is, the escape key, the # key, the 5 key, and while holding down the CTRL key press the \ (backslash) key. The first three characters are the "set default tabs" sequence for the PRT: device, and the <CTRL> combination terminates the COPY command. The result of this is a file called SetTabs in your S: script file directory, which is a good place for setup files like this.

Here's how to use SetTabs. Let's say you have a file called MyFile that you want to print with tabs. Enter the following line at the CLI prompt:

JOIN S:SetTabs MyFile AS PRT:

This command first copies S:SetTabs to PRT: setting eight-character tabs, then copies the file MyFile to the printer as well. Voila! The file is printed with correctly expanded tabs. Since the JOIN command can accept up to 10 parameters, this technique is quite flexible. For instance, suppose you'd like to put form feeds between the files you print. Just COPY a CTRL-L (ASCII 12) into a file called S:FormFeed, then type:

JOIN file1 S:FormFeed file2 S:FormFeed file3 AS PRT:

This will type out the three files with form feeds between the files. There are printer device codes for turning on NLQ mode, switching character sets, setting margins and many other things.

Mic Kaczmarczik
Austin, TX

CLI Clock

If you would like to have a clock display up and running when you power up with a CLI disk, do the following:

1. Copy both the Clock and Clock.info files to your CLI disk (I didn't copy them into the C directory) from the Workbench disk.
2. Edit (with ed) the S/Startup-Sequence to include these commands:
   DATE ?
   NEWCLI
   CLOCK
3. Save the file by pressing the ESC key and the X key, then return.

If you already have a DATE command present in your startup sequence, you don't have to include it again. Be sure to set the time as well as the date when prompted. The NEWCLI command is necessary because the CLOCK must run as a separate process (isn't multitasking great!). All that is left to do is select the digital clock (if you prefer), move the clock to an appropriate position, then relocate and size the active CLI window (CLI 2 was active for me).

Michael McFarland
Littlerock, CA

Modula-2 Icons

The manual that comes with TDI Modula-2 doesn't mention that programs written in Modula-2 can be run from the Workbench by creating an icon for the program with the Icon Editor (Iconed) in the System drawer of the Workbench 1.1 diskette.

All you need to do is run the Icon Editor program and use one of the blocks to draw an icon for the program. Instructions for use of the Icon Editor should be included in your Amiga User Guides. After you are satisfied with your rendition, you need to save the icon with the program. Since the icons loaded initially are Project icons, and Modula-2 programs are projects, you need not worry about which type of icon you need to save it under.

Shawn Cyr
Tempe, AZ

TYPE Rather Than ECHO

I have noticed that many people who create batch files in AmigaDOS use the ECHO command to get something on their screen. While it is absolutely OK to use this command to print a single line, the Amiga tends to get slow when it has to display more than a few lines. This is because the ECHO command has to be loaded into memory every time the computer reads the command. A much faster way to print something to the screen in AmigaDOS is to create a text-only file with ED and use the TYPE command. Try creating two files with ED, one using ECHO for every line and the other just straight text. Use TYPE to display the second file and see for yourself how much faster it is.

Jurgen Impens
Oost-Souburg, Holland

Multi-Preferences

While Preferences is a wonderful tool for tailoring the Amiga environment, it is limited to saving only one set of system preferences while possibly using another. Those who use more than one printer, or want ►



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fine control of their mouse for drawing, but a fast mouse for just "mousing" around, may wish for an automated way of switching between specific system preferences.

To solve this problem, I devised the following two command files, which live in my SYS:s directory. The first file reads:

```
file save-sys
KEY name/a
copy SYS:devs/system-configuration to
  SYS:devs/system-<name>
end of file
```

The second file reads:

```
file restore-sys
KEY name
IF EXISTS sys:devs/system-<name$normal>
  copy SYS:devs/system-<name$normal> to
  SYS:devs/system-configuration
  SYS:preferences
ELSE
ECHO "SYS:devs/system-<name$normal>
  not found. . ."
ENDIF
end of file
```

The first thing you should do is EXECUTE SAVE-SYS NORMAL, which makes a copy of the currently saved system configuration. This should be the configuration that you expect to use most often. This configuration can be restored by EXECUTE RESTORE-SYS, with no argument. When the Preferences screen comes up, just click LAST SAVED and USE.

Other configurations, such as one set up for a second printer, can be saved and restored as follows:

```
EXECUTE SAVE-SYS PRINTER2
EXECUTE RESTORE-SYS PRINTER2
  (click LAST SAVED and USE)
```

David Reddy
New York, NY

Borderless Basic

We have grown pretty accustomed to Amiga Basic's window environment. We also know we can assign various attributes to these windows using the WINDOW command. However, even with all gadgets removed (sizing, fore/back, title bar, etc.) using an attribute of "0", we still have a broder around the window. For the special occasion when you might not want a "framed" window, I have a partial solution. Apparently the gadgets and the window border color is controlled by PALETTE 1. By setting PALETTE 1 to the background color (PALETTE 0), the border is "invisible." However, there are two things you must do. First, you must set an appropriate foreground/background combination using the COLOR command. This enables your text to be written (and seen) on the screen. Secondly, as part of your program closeUp, you should reset your PALETTE and COLOR to the default. This eliminates display problems after exiting BASIC. Another problem that occurs is that your BASIC menus are affected by your palette changes and as such can't be easily seen while using this "trick." Here is a simple program to demonstrate the borderless window trick:

```
SCREEN 1,320,200,2,1
WINDOW 2,,,0,1        'plain window no
                      gadgets
WIDTH 38
PALETTE 1,0,.3,.6     'set to Amiga Blue
PALETTE 2,1,1,1       'set to white for text
COLOR 2,0             'foreground/back-
                      ground pens
Text:
  LOCATE 6,2 : PRINT "A borderless win-
    dow?"
  LOCATE 8,2 : PRINT "Palette 1 is set to
    background color"
  LOCATE 10,2 : PRINT "Text can be writ-
    ten using appropriate fore/background
    combinations"
  LOCATE 15,2 : PRINT "When done reset
    palette."
  WHILE MOUSE(0) = 0:WEND     'wait
CloseUp:
  PALETTE 1,1,1,1       'reset palette
  COLOR 1,0             'reset fore/back-
                        ground colors
  WINDOW CLOSE 2
  SCREEN CLOSE 1
  END
```

Earl Davis
Marion, OH

CTRL in CLI

Did you know that the CTRL key can be used in the CLI? If you have typed in a wrong line, you don't have to hit the back space key numerous times, just press CTRL-X (press and hold the CTRL key and press the X key at the same time), and the line will be deleted.

If you want the CLI to execute several commands, just type in the command, then before pressing the return key, press CTRL-J. The cursor will then move to the next line. Type in the next command, press CTRL-J again, etc. for as many commands as you wish. When you have them all typed in, just press the return key and all the commands will be executed.

If there is something at the top of the screen that you want to keep for a while, but the cursor is near the bottom of the screen and the next command you type will scroll the screen, just use CTRL-K a few times and the cursor will move up the screen. Pressing the return key brings back the prompt. To clean up your window, try CTRL-L and return.

One last tip. At a system request, instead of clicking RETRY, just press the left Amiga key and the V key simultaneously.

Philippe Mussler
Reinach, Switzerland

ImagewriterII Printing

Ever since *AmigaWorld* recommended the Apple ImagewriterII color printer (Nov/Dec. 1986), I have been determined to print out my graphics creations on this machine. Unfortunately, this is not the easiest printer to install. After gleaning information over a period on months, I would like to wrap it into a single package for others who may still be struggling.

You will need an Apple IIe modem cable with a DB25 connector on the Amiga end, and an eight-pin mini-circular connector on the other. Plug the DB25 into the modem port (below the telephone receiver symbol on the back of your Amiga); you can't go wrong with the other end.

From the CLI, find out whether your program disk contains a serial driver and the correct printer driver. If this disk is in df0:, type:

```
DIR DF0:DEVS OPT + A
```

If you see both of the following files, you have the correct software: "serial.device" (under the DEVS directory) and "ImagewriterII" (under the PRINTERS subdirectory). Otherwise, put a Workbench 1.2 disk into your external drive and type:

```
COPY DF1:DEVS/SERIAL.DEVICE TO
  DF0:DEVS
COPY DF1:DEVS/PRINTERS/IMAGE-
  WRITERII TO DF0:DEVS/PRINTERS
```

Next, select Preferences from your program disk, then click on the Change Printer box. Click on the Serial box. To the right of this box is a pair of arrows. Use them to select the Custom printer. Click on the text gadget ►

to the right of Custom Printer Name. Using the arrow keys and the back space key, delete whatever is written there and type in "ImagewriterII". If you plan to print in color, click on the Graphic Select box, and then on the Color box. Select the OK box to leave this screen, and do it again to leave the next. Exit Preferences by clicking on Save.

From the ImagewriterII, disconnect the power cord and remove the cover. Manually move the printhead toward the right. In the front-left corner you will see two banks of DIP switches. The bank on the left (labeled SW1) contains eight switches: Set all of them on "open" (up).

The bank on the right (labeled SW2) contains six switches. Close switches 1 through 3 and open switch 4. Leave switches 5 and 6 alone. At this point, you may want to replace the black ribbon with a color cartridge. Replace the cover, connect the power cord and turn on the printer. You are now ready to roll!

Mark Swanson
Talleyville, DE

Printing Kaleidoscope

When I first got my Amiga, I wanted a printout of some of the screens generated with Electronic Arts' Kaleidoscope program, but found that I couldn't do it. After a bit of poking around, I found that there are no Preferences on the disk. I copied the Kaleidoscope program onto a blank disk, set up my Preferences the way I wanted and then copied Preferences onto the disk as well. This solved the problem.

Jeffery Hall
Carmi, IL

Dummy Textcraft Icons

I had a large number of Apple files that I wanted to transfer to my Amiga. I figured out how to transfer the files, but then I had to figure out a way to read the files with Textcraft. The solution I came up with is fairly simple and could work with other text files that don't have icons.

First, create a dummy file in Textcraft (a document without any text) and save it as a text-only file. Use the name of the file without an icon. Next, copy the original file to the Textcraft disk using the same name. The save replaces the blank dummy file with the real file, but leaves the icon attached. Reentering Textcraft, you can now call up the file for editing, etc. It is important that you save the dummy file first and then copy your real file from another disk, otherwise you will erase the real file when the dummy is saved.

Ron Thomas
Calgary, Alberta, Canada

Epson JX-80 Tips

I am an Epson JX-80 owner and, as pointed out in the Nov./Dec. 1986 issue of *AmigaWorld*, waiting 10 to 15 minutes for a picture can be frustrating. When doing black-and-white printing (such as a poster to be photocopied or text with Note Pad in graphic mode), changing the Preferences printer setting to "Epson" makes the printing go much faster. This makes the Amiga think that you have just a black-and-white printer, and since the JX-80 supports the normal Epson control codes, this works just fine—and faster. The reason it is faster is that even if you only send black and white to the JX-80 (in graphics mode), it makes four passes (black, red, blue and yellow). The Epson driver only makes one pass (it thinks you have only black). Also, if you do a lot of text printing (listings, letters, etc.), you can use the less expensive Epson MX-80 ribbon instead of the four-color JX-80 ribbon.

Michael Carpenter
Orange, CA

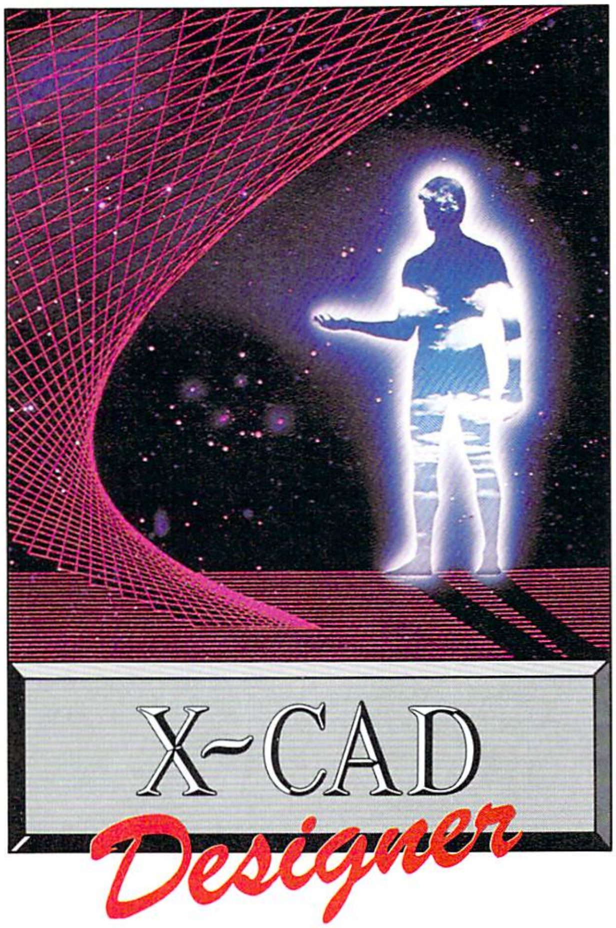
Deluxe Images

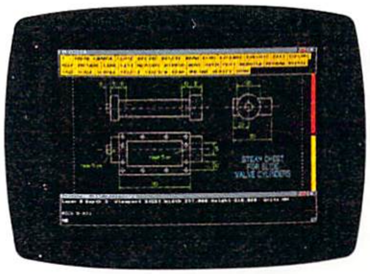
DeluxePaint and Aegis Images nicely complement each other with their many wonderful features. In creating artwork, an artist can switch back and forth between the two programs to take advantage of their individual strengths. Simply use one program to create a picture, save it on disk, change to the other program, then reload the picture and continue working on it. Using DeluxePaint, you will have no problem loading pictures created using Images (in the same resolution). However, Images automatically appends .pic or .hpic to picture names, and it only recognizes and loads files with these suffixes. To be able to use Images to work on pictures you started with DeluxePaint, you should save your DeluxePaint picture with names ending in .pic (in 320 × 200 mode) or .hpic (in 640 × 200 mode) so that they are accessible by Images.

Lori Sandler
Northridge, CA

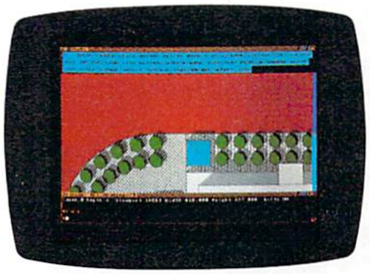
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Alternative Education: Learning by Amiga

The right software on the Amiga could make even homework fun! Here's a sampling of some Amiga educational software representing different approaches to learning.

By Neil Randall

For many parents, the choice of which computer to buy often depends upon which computer will be the most help to their children with their schoolwork. The Amiga's potential in providing such help is obvious. Its graphics can aid the student in visualizing problems, while its music and sound capabilities allow educators to focus on the student's auditory development. Multi-tasking should enable students to work on several related lessons at the same time, and the Amiga's speech synthesis lets the computer act as a second teacher. While none of the educational software currently available for the Amiga uses all of these features, the best programs are clearly aiming in the right direction.

Best of the Bunch

The most useful, complete and attractive packages come from First Byte Inc., of Long Beach, California. *KidTalk, Speller Bee, MathTalk* and *First Shapes* combine fine graphics with helpful, comprehensible speech synthesis. *KidTalk* is a talking word processor, *First Shapes* teaches geometrical shapes to preschoolers, and *Speller Bee* and *MathTalk* help elementary school students improve their skills in spelling and arithmetic.

Each program uses icon-based menus and submenus. *KidTalk's* Notebook menu, for instance, shows an icon of a binder. Clicking on this icon brings up a full-screen submenu of six further choices, each with its own icon. Open shows the notebook opening, Close shows it closing, Save displays a page being inserted into the notebook, and so on. From the Fix It menu the student can cut, paste and copy blocks of text, while the Control Panel enables the child to change the Amiga's voice and even produce dialogue. More experienced students can avoid the icon-driven menus by using pull-down menus, and those who really know what they're doing can operate the program from the keyboard.

Central to *Speller Bee* and *MathTalk* is the capability of constructing word lists and arithmetic problems based on the student's schoolwork assignments. *Speller Bee* provides fifteen built-in lists, but the student can create as many new ones as desired. *MathTalk* allows problems (addition, subtraction, multiplication and division) of enough complexity to sustain the student through most of elementary school. Both programs provide several ways to play with the material, with *Speller Bee* focusing on spelling practice, spelling games and a spelling bee, and *MathTalk* emphasizing problem solving and tables practice. Of special note is *MathTalk*'s computer tutor, Professor Matt A. Matics, who clearly and competently explains any problem the student is working on.

The manuals for all the First Byte programs explain not only how the programs work, but what the student can do with them. In addition to setting forth the program's educational goals, each manual suggests several extra learning activities. One of *First Shape*'s suggestions, for example, is to take the child to an art museum and look for shapes in the paintings and sculptures, to give him an idea of how shapes are used in art. Important in all these suggested activities is the designers' realization that parents and teachers need ideas for reinforcing the lessons provided by the software.

Electronic Textbooks

While First Byte's packages work hard at making structured learning as enjoyable as possible, MicroEd Inc. is ►

offering programs that get rid of the fun almost completely. Written entirely in BASIC, and taking very little advantage of the Amiga's special features, MicroEd's packages are all essentially the same. In each, the student reads the information presented, then is tested on that information with a fill-in-the-blanks quiz, and later, a master test to examine retention of the material. Unattractive and uninspiring, MicroEd's packages pale beside the colorful, useful offerings from First Byte.

This is not to say they have no value, however. *The Spelling Detective Game* goes far towards helping programmers understand and use the SAY command in Amiga Basic. The *Vocabulary Series* will help almost anybody improve vocabulary, while the *Punctuation Series* offers similar aid in the vagaries of using commas, periods, colons and quotation marks. By far the most impressive aspect of MicroEd's packages, in fact, is the sheer amount of information they contain. Aesthetically they are disappointing, but they do have a lot to teach.

Much more interesting, but certainly no more innovative, are MicroEd's digitized pictures series. *Across the Plains, Fur Trade of the Great Lakes, Making our Constitution* and *The Lewis and Clark Expedition* are the first four entries in the History series, while such titles as *The First Christmas* and *In the Promised Land* launch the Bible series. Each of these programs, while retaining MicroEd's standard read-and-respond format, makes use of digitized pictures as a teaching aid. In *Lewis and Clark*, for example, each mini-quiz is followed by a full-screen digitized photograph of the event just discussed, while in *Introducing Maps* (from another series), topics such as Legends, Hemispheres and Weather are illustrated with a digitized picture. Most of these packages contain more than one disk (Lewis and Clark has five), and all provide a considerable amount of information. But even with the photographs they are still rather mundane, since the pictures do not contribute to the student's participation in the program. These programs are basically textbooks on a disk, more expensive than an illustrated book but only slightly more interactive. They will please students who like to use computers, but they will hold little appeal for anyone else.

Beyond the Crayon

By far the strangest educational package I have come across is the *New Technology Coloring Book* from The Software Toolworks (distributed by Electronic Arts). Like MicroEd's software, the *Coloring Book* provides illustrated information, but this program makes far better use of the graphics to promote learning. On the disk are several topics from which the user chooses. Ranging from Black Holes to Skylab, the topics cover a wide variety of technological areas of interest. The student simply clicks on one of the topics, and an uncolored drawing appears on the screen. From here, the student can select a short essay about the topic or color the drawing. When he is finished coloring, he can call up a color key that explains what the colored regions represent. Each topic provides roughly the same amount of information as a short encyclopedia article.

The *New Technology Coloring Book* is strange in two ways. First, even though it is a color-by-number system, the student doesn't actually color in the regions as in a traditional coloring book. He simply selects color #1 from the menu, and the program executes a Fill on the region of the drawing labelled #1. Secondly, the intended audience is unclear. While the on-disk information tells us that coloring the images helps reinforce the written information, the information itself is written for a fairly advanced student. Since educational software need not be designed only for children, I have no quibbles with this approach, but the simplicity of the coloring procedures and the limited usefulness of the program as a whole could well leave an advanced user somewhat dissatisfied. Going through all the topics takes only a few hours, after which the program is best passed on to someone else.

Learn While You Play

Finally, we come to the most fun package of all. MicroIllusions' *Discovery*, released in a math version and a spelling version, features superb graphics, a melodic stereo sound track and an addictive game. In the game, the player controls one of four possible characters. The character jumps over holes and stray creatures, climbs and descends ladders, and answers questions to get past barriers, all to find twelve fuel crystals and save the Discovery space ship. At several points, a barrier bars the character's way. Here, the player is asked, in the math version, to solve an arithmetic problem, or, in the spelling version, to spell a word. Both versions use the Amiga's voice to ask the questions, although the math version prints the problem on the screen as well.

Discovery is very good, but it could be even better. A utility in the spelling version to allow the player to enter his own word lists would be extremely useful, and the math version would benefit from types of problem solving beyond simple arithmetic drill. Further, the game itself is little more than a clone of Timeworks' *Cave of the Word Wizard* of a couple years back, and this suggests that the designers of *Discovery* put more effort into graphics than game design. More seriously, MicroIllusions should have packaged the two versions together, since the only difference between the spelling and the math versions are the problems themselves. Finally, the spelling version suffers from the limitations of the Amiga's voice, but this problem is common to every Amiga speech-centered program I have seen. Still, *Discovery* sets itself apart in one important way: it is compelling. Of all the Amiga educational programs I have examined, *Discovery* is the only one my children repeatedly ask for. The rest, even the excellent First Byte offerings, require a little coercion.

Leading the Way

The final test of any educational program, of course, lies with the users. For my daughters, aged seven and nine, *Discovery* math is the hands-down winner, a program they return to again and again. *Discovery* empha-

Software Spotlight

"What a great program! Where can I find it?"

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Associated Computer Service *(Grade Manager, $89.95; Music Student Series I and II, $59.95 ea; Quiz Master, $79.95),* 1306 E. Sunshine, Springfield, MO 65802, 417/887-7373.

Eclipse Data Management *(KWIK-SPEAK I, Spanish II, $46.95 ea),* 312½ Lafayette St., Glendale, CA 91205, 818/840-8757.

Finally Software *(Señor Tutor, $69.95),* 2255 Ygnecio Valley Rd., Suite N, Walnut Creek, CA 94598, 415/935-0393.

Electronic Arts *(Intellitype, $49.95; New Technology Coloring Book, $19.95),* 1820 Gateway Drive, San Mateo, CA 94404, 415/571-7171.

First Byte, Inc. *(Kid Talk, Speller Bee, Math Talk, Math Talk Fractions, First Letters and Words, First Shapes, $49.95 ea),* 3333 E. Spring St., Long Beach, CA 90806, 213/595-7006.

JMH Software of Minnesota *(Talking Coloring Book, $29.95),* 7200 Hemlock Ln., Maple Grove, MN 55369, 612/424-5464

MicroEd, Inc. *(The Spelling Detective Game, $39.95; Vocabulary Series, $49.95; Punctuation Series, $29.95; Across the Plains and Introducing Maps, $59.95 ea; Fur Trade of the Great Lakes and Making Our Constitution, $79.95 ea; The Lewis and Clark Expedition, $89.95; Bible Series programs, $29.95 ea),* PO Box 444005, Eden Prairie, MN 55344, 612/944-8750.

MicroIllusions *(Discovery Math and Spelling, $39.95 ea; data disks in additional subjects, $19.95 ea),* PO Box 3475, Granada Hills, CA 91344, 818/360-3715.

Mindscape Inc.*(Keyboard Cadet, MasterType, $39.95 ea; The Halley Project, $9.95; The Perfect Score, $79.95),* 3444 Dundee Rd., Northbrook, IL 60062, 312/480-7667.

The Other Guys *(Talking Storybook, Match-It, Math-A-Magician, $39.99 ea),* 55 N. Main St., Suite 301D, PO Box H, Logan, UT 84321, 800/942-9402.

Queue Intellectual Software *(assorted grammar, reading, history, geography and vocabulary, from $34.95 to $65),* 562 Boston Ave., Bridgeport, CT 06610, 800/232-2224.

True BASIC Inc. *(upper-level math, $49.95 ea),* 39 S. Main St., Hanover, NH 03755, 603/643-3882.

Unicorn Software Company *(Animal Kingdom, Decimal Dungeon, Fraction Action, Kinderama, Math Wizard, Read & Rhyme, Read-a-rama, $49.95 ea; All About America, $59.95),* 2950 E. Flamingo Rd., Las Vegas, NV 89121, 702/732-8862.

sizes learning through enjoyment, whereas the MicroEd packages, which my kids refuse to look at, insist on learning through hard work and repetition. To my mind, though, First Byte has the early lead in educational software development for the Amiga. Extremely useful and very attractive, First Byte's offerings reinforce the material the student learns in school. Their programs point the way, more than any of the others, to the enormous potential of the Amiga as a teaching tool. As other educational software producers enter the field, we should soon begin to see even more of that potential realized. ■

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Editor's Note: This article is a review of certain Amiga titles and does not cover the entire Amiga educational software market. Other packages (and series of packages) are available and range from programs that make no use of the Amiga's special capabilities to programs that use animation, fancy graphics, music and sound. AmigaWorld *will cover other titles in the future. See the Software Spotlight with this article for a complete listing of available educational software.*

Amigas at WORK

Essential Asset For Small Enterprise

Amigas make the difference at three small businesses

BY PEGGY HERRINGTON

EVERYONE KNOWS how small businesses use personal computers to do bookkeeping, accounting, mailing lists, and so forth. But people don't buy innovative computers like the Amiga just to balance the Receivables with the Payables. We've found that many small-scale entrepreneurs make their Amigas an integral part of *what* they actually do for work, as well as *how* they keep track of it.

Imagine it: One couple in California design beautiful, high-performance kites with an Amiga and now employ a staff of 30 people and take in some substantial revenue. Another woman built an entire communications training/consulting firm around her system and sports some big-name New York businesses on her client list. A third small enterprise in upstate New York became the leading TV production facility in its area by using an Amiga to generate motion graphics for much of its contract work. And you can bet all three of them also put their systems to work when it comes to handling the books around the office.

It wasn't easy to narrow our "Amigas at Work" profiles down to these three. We found a substantial number of small businesses around the continent doing everything from soup to nuts (and then some) with Amiga 1000s—a landscape architect in southern California, a Christian book publisher in central New York, a livestock and farm equipment distributor in western Canada and even a husband-and-wife trucking team with a built-in mobile Amiga.

Yet, our three "winners" provided an irresistible combination of diversity, creativity and achievement we couldn't overlook. So let's start off by. . .

Flying High

If intricate, richly-arrayed kites sailing along in a blue sky pick your head up, then see Don and Patricia Tabor of San Diego, because their high-tech offerings are, literally, "Top of the Line." Unlike your ordinary March-type kid models, however, the Tabors' kites are often flown in formations like those of the famous Blue Angels by teams of grown men with their feet (physically, at least) planted firmly on the ground. Constructed of colorful patterns of boat sail over frames of fiberglass, these kites sell for $150 to $200 through dealers worldwide.

The story behind Top of the Line Kites is part Horatio Alger, but the Tabor's success is also due to efficient management of resources, not the least of which is an Amiga 1000 with 512K of memory and two disk drives. "We started Top of the Line in 1982 by selling our car to raise the operating capital," Don Tabor told us. By the summer of 1987, they were looking to buy land on which to build a plant for their ever-expanding production crew of 30. To raise the extra investment capital needed, they made their presentation to the bank with stylish, professional-quality financial reports prepared on the Amiga with B.E.S.T. Business Management software.

The Tabors use the B.E.S.T. system for all of their accounting and business needs, bypassing only its purchasing functions because they buy in bulk by phone. They use the configurable report generator to produce personalized monthly reports for each of their clients (the retailers), after which they run those same 300 fan-folded, single-page reports back through their Juki 5510 printer

a second time, adding a column of text down one side in newsletter format with Scribble!. Don finds this keeps their cash flowing better than sending standardized monthly statements. They also use Gizmoz utilities and Scribble! to design catalogs, flyers and new product (mostly kite accessories) announcements.

The Tabors bought their Amiga in early 1986, and Don admits that the extent of their computer knowledge at that point was simply that they needed one. They were tired of being buried under paperwork and felt that a computer would rectify the problem and also show them an effective path to growth in the future. Conducting his own research, Don selected the Amiga because of its combined business and graphics potential. Their first program was DeluxePaint (since upgraded to DeluxePaint II), which they use not only for illustrating their catalogs and instruction sheets, but also for production design. "We hold the kite materials up to a window to backlight them so we can match the colors on screen in Deluxe-Paint," Don explained. "That way we can design them using different patterns and color combinations and see how they'll look in the sky before we actually build them. It's real nice."

Some of the employees at Top of the Line have also ►



ILLUSTRATED BY BOB SCOTT

been using the Amiga—but it isn't getting the company any new contracts. Games, especially The Bard's Tale and Chessmaster 2000, are big favorites. Don, himself, is a fan of computerized chess but admits he doesn't have much computer time for it. Recently he began learning to operate the Amiga from the CLI (Command Line Interface) in order to integrate more fully some of his design and management tasks.

When he does get away from the keyboard, he and his flight team (Ron Reich and Eric Streed) are usually off practicing their formations for the many American Kite Flyers Association competitions they attend. They've won many awards over the years, but the *pièce de résistance* came last August when they were asked to demonstrate their skills at a Miramar Air Force Base air show by special invitation of the fly-boys who sparked their interest in flying in formations in the first place, the Blue Angels themselves.

Studio 1000

Synergetic is the leading TV production facility in Syracuse, New York, and one lone Amiga has helped them get to that spot. With a 3,000-square-foot sound stage, Synergetic is well equipped to produce television commercials as well as corporate and industrial training and marketing films. The company builds its own sets, casts talent, designs costumes, provides music and sound effects, and helps with scripts.

"About 60% of our work is non-broadcast training and marketing videos, documentaries and other special projects, and we use the Amiga to generate motion graphics for many of these," Synergetic president Ron Friedman told us. "Although it provides work that is technically as good as the broadcast-quality work we do in one-inch (television) format, the Amiga, as you know, has some limitations concerning the signal it generates. But for these applications it has worked well. Effectively, it's a very fast and relatively easy way to do simple animations.

"We also have a beautiful high-end digital effects system that enables us to take things and bend them and change the image plane. And we're specialists at what is known as Ultimat—like on television when they show a weather map with someone in front of it, only the person isn't really there—and we have created some extraordinary illusions. We've put deserts in the middle of the studio and had people coming out from behind rocks. Using a combination of these elements, we can take things that we generate with the Amiga, put them into this system and give them perspective so that they appear to be surfaces that you can walk on."

Synergetic has an Amiga 1000 with two disk drives and the StarBoard2 two-megabyte RAM expansion board. "One of the greatest advantages is the IFF standard, which let's us create graphics with one program and use them in another," Ron says, which may be one of the reasons its studio software library resembles a computer store; it includes DeluxePaint II, DeluxeVideo, Aegis Draw and Aegis Animator among other programs. Synergetic also has DigiView and Amiga Genlock and is anxiously awaiting the availability of a frame grabber.

The Amiga itself resides on a rolling table so that it can be moved easily between the studio and the business office, where Barbara Cokus, production and administrative assistant, uses it with a host of other products, primarily B.E.S.T. Business Management. Barbara's prior exposure to computers was limited to one Apple word processing course that, she claims, was more substantial than her accounting background. Spending an estimated two hours a day with B.E.S.T., however, she is able to do Synergetic's invoicing and statements, summary reports, status of accounts and top 10 customer lists. "With the touch of a button I can see who is past due, what our summaries are and how much income is projected for next month—it's just become invaluable to us," she says.

Barbara uses an Epson FX-85 printer and recently purchased PHASAR: The Financial Manager for tracking Synergetic's checking account and for preparing non-sales related tax reports. "Sometimes people call and ask if we're computerized and, if so, what system we use," she remarked, "and I tell them that for the money the Amiga is the best system they'll find anywhere. When I'm not using it for business functions and Ron isn't generating graphics, our clients just like playing with it. We do have some games and several clients are Amiga users themselves."

In fact, one of their clients, Gary Cianciosi, now president of the local Amiga users group (the Central New York Amiga Aggregate) is responsible for Synergetic getting involved with the Amiga. It was in early 1986 that

Gary convinced Ron to get an Amiga for its graphics capabilities, soon after which Ron introduced it into the accounting and business procedures. But Gary didn't stop there in his assistance to Synergetic. "Thanks to our evangelistic friend preaching the gospel of the Amiga, we get to see literature and demos on all the new products, often before they are available," says Ron with a grin. "My hope is that along with more improved software—and some of what I've seen is just marvelous—we will be able to generate improved aesthetic possibilities with better technical output. The Amiga is so easy to use we'd like to use it more, and I'm hopeful we will be able to do just that. It seems there are so many people developing things for the Amiga who refuse to believe that what they want to do can't be done, that they just go ahead and do it anyway."

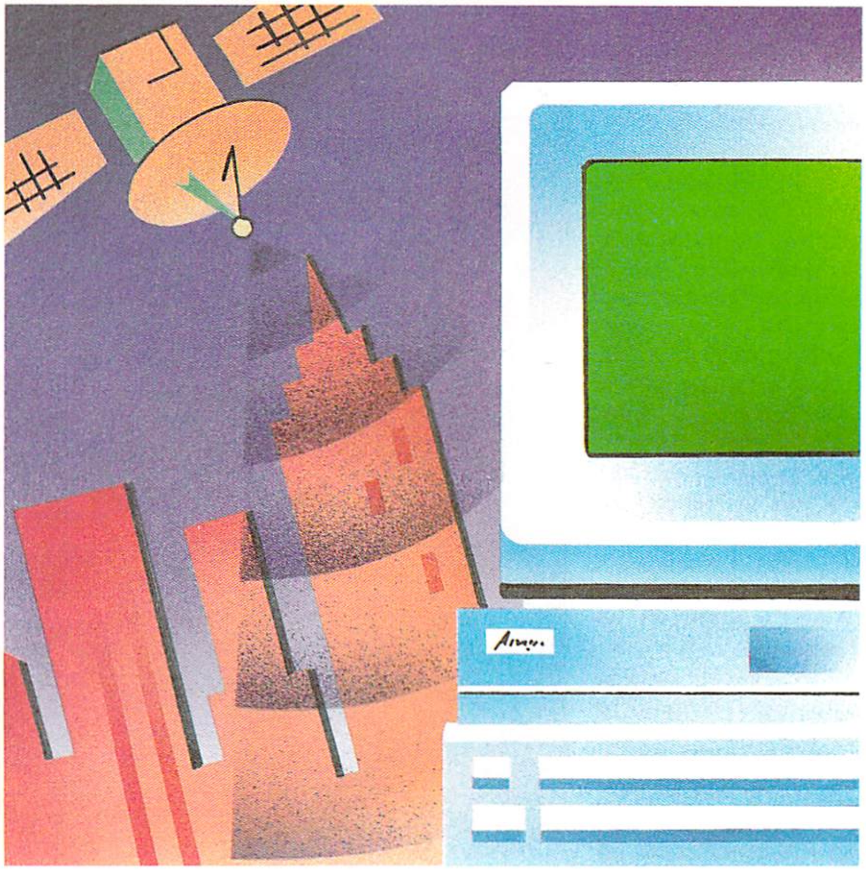


No Confusion at Fusion

Nestled fashionably in downtown Manhattan is the Fusion Group Ltd., a communications consulting firm. Established in 1985 by Jennifer St. John (who has almost a decade of experience in the business), Fusion teaches people to make more effective business presentations, to sharpen personal communications skills, to organize more productive group functions and meetings, and so forth. Roughly half of its clientele is referred by advertising agencies. Many of these people have presentation materials in hand but lack the skills to use them. Others may have Fusion design their presentation packages and then attend workshops to learn how to use them most effectively. A third type of client seeks personal enhancement training. The Fusion Amiga is used in all of these areas.

Jennifer knew what she wanted from a computer when she first organized the company, and she did a good deal of comparison shopping. "I had three or four primary issues," she recalls. "One was word processing, another was graphics and a third was business management. I looked at the IBM systems that were available at the time, and they cost anywhere from fifteen to eighteen thousand dollars to do what I wanted to do effectively. I looked at Apple, but its equipment still was going to cost me nine or ten thousand dollars. Then I found the Amiga and suddenly I could do it all for about three thousand. It was ►

real entertaining—and very exciting—to spend the money and get everything computerized that fast." Chuckling, she added, "When I started Fusion, it was just me in a telephone booth."



Fusion now supports a staff of six, a very impressive suite of offices and two Amiga 1000s. The system in Jennifer's office is equipped with 512K, two floppy-disk drives and a Supra 20-megabyte hard disk, a switching box for two printers (a color Epson JX-80 and a new GQ-3500 laser) and an Easyl graphics pad. "I use it to compose our programs and design graphics and visual aids, primarily with DeluxePaint II and Scribble!," she says. She was just beginning to work with Publisher 1000 when we talked, and was looking forward to getting Online! (version 2.0) to access CompuServe and American PeopleLink.

Fusion's one-on-one personal enhancement training program, where sessions focus on relationships and motivation and are tailored to individual needs, also makes use of the Amiga. The Amiga monitor is used as a visual aid, featuring a personalized slide show created with DeluxePaint II and the Easyl graphics pad, at the conclusion of which screens are dumped to the color JX-80 and assembled in a notebook the individual can take home for further study.

The other Amiga at Fusion is located in the administrative office where it is used for accounting and billing with Chang Labs' Rags to Riches. Jennifer described a few initial problems with the program, but said, "That settled itself with the help of the people at Chang Labs." Her assistants use Scribble! for correspondence, mailing labels and training program outlines, and they print all outgoing materials on an Epson LQ-1000 letter-quality printer.

Speaking from her white conference room at the end of our interview, Jennifer summed up her feelings about the Amiga: "Basically, it's the be-all and end-all of office management for us. We use it as a teaching tool and a publishing tool, and it helps with the sales presentations and does all of our grunt work. We would be up a creek without it, although we wish we had a little more support as to how things work. But I guess that's the price you pay for being a pioneer."

Conclusions

Despite the fact that all of these people are Amiga pioneers, not one of them seems to regret the decision to put his or her money on the line, literally, with an Amiga. Jennifer St. John put it very well when she went so far as to say that her Amigas are so important to her business that if something happened to one of them, she would simply have to go out the next day and buy another one. Besides the coffee machine, there aren't too many other fixtures around the office that would get such an unqualified endorsement.

Product Information

B.E.S.T. Business Management
See the Business Buyer's Guide on page 30.

Scribble!
See the Business Buyer's Guide on page 30.

Gizmoz
Digital Creations
1333 Howe Ave., Suite 208
Sacramento, CA 95825
916/344-4825
$69.95

DeluxePaint II
DeluxeVideo
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
415/571-7171
$129.95, $99.95

Supra 20MB Hard Drive
Supra Corporation
1133 Commercial Way
Albany, OR 97321
503/967-9075
$995

Easyl
See review on page 74.

Publisher 1000
See review on page 73.

Online! 2.0
Micro Systems Software
12798 Forest Hill Blvd.
Suite 202
West Palm Beach, FL 33414
305/790-0770
$69.95

Rags to Riches
See the Business Buyer's Guide on page 30.

StarBoard2
Microbotics Inc.
811 Alpha Dr., Suite 335
Richardson, TX 75081
214/437-5330
$879

Aegis Animator
Aegis Draw
Aegis Development
2115 Pico Blvd.
Santa Monica, CA 90405
213/392-9972
$139.95
$199.95

DigiView
NewTek Inc.
115 West Crane St.
Topeka, KS 66603
800/843-8934
$199.95

PHASAR: The Financial Manager
Finally Software
2555 Ygnecio Valley Rd.
Suite N
Walnut Creek, CA 94598
415/935-0393
$99.95 ■

Business Buyer's Guide

Compiled by Linda Barrett

SO, YOUR FILING cabinet is bulging as if it's pregnant and the type bars are falling off your old manual Smith-Corona. Perhaps it's time to invest in some business software. A database or spreadsheet would relieve the strain on your filing cabinet and a word processor would let you give your faithful typewriter a decent burial. But which database, spreadsheet or word processor? And what about a financial program to replace those ink-splotched ledgers? Don't run from store to store listening to salesmen, just read *AmigaWorld*'s Business Buyer's Guide to find the programs you need.

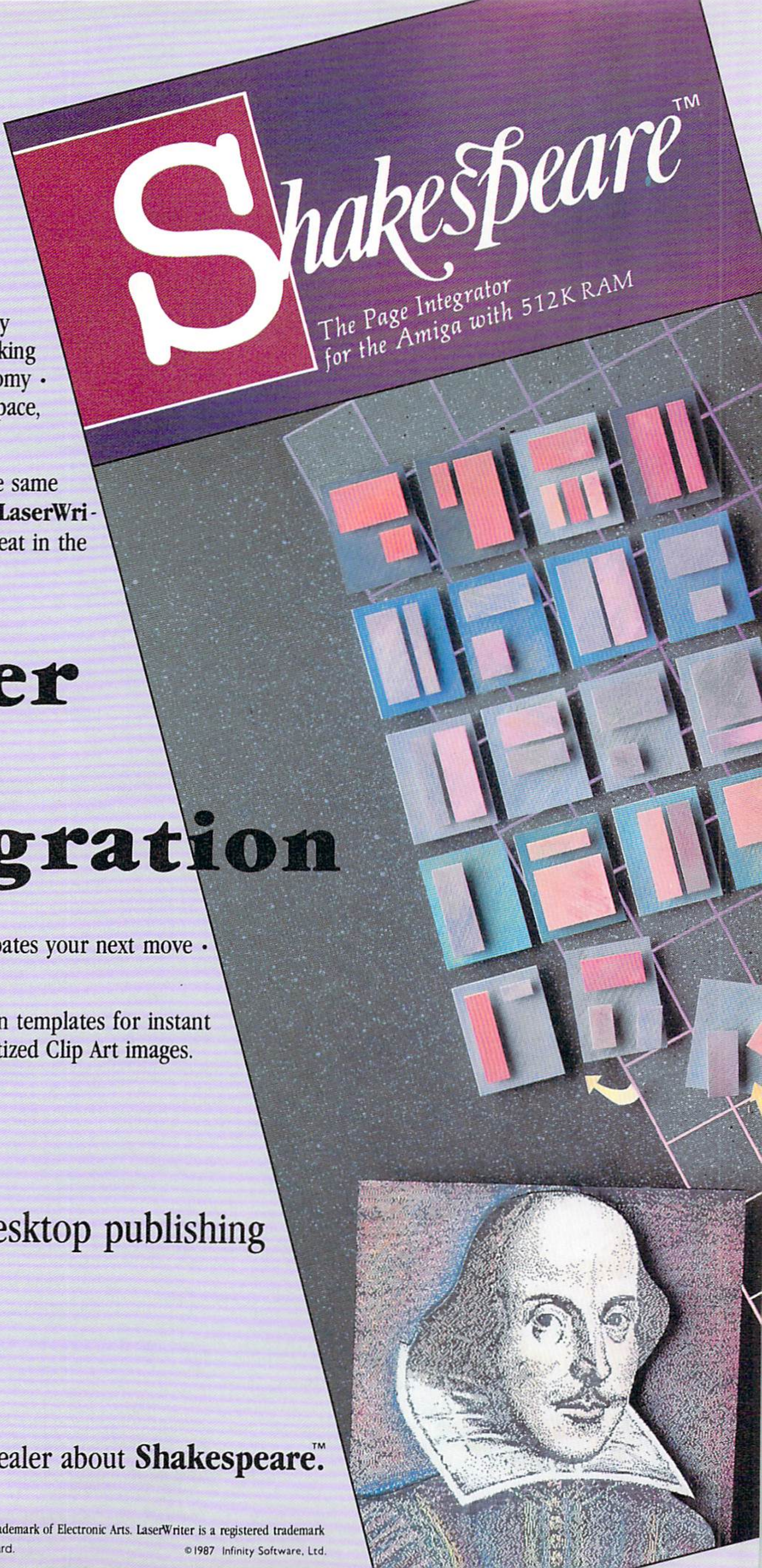
DataBases:

Product	Manufacturer	Price	Comments
A Filer/A Report	MegaSoft Limited	$ 59.95	12-field records, disk file creation, creates reports from data files
Acquisition	Taurus-Impex Inc.	299.95	relational sorts, IFF and dBase III compatible, distributed by Haitex Resources
Acquisition Pioneer	Taurus-Impex Inc.	139.95	scaled down version of Acquisition, relational sorts, IFF compatible, distributed by Haitex Resources
Datamat A-200	Transtime Technologies	249.95	relational, identical user interface across hardware-OSs, data dictionary, simple statistics and word processor
Datamat A-300	Transtime Technologies	349.95	same as above plus: statistical functions (regression analysis), graphics creation output
dBMAN	VersaSoft Corp.	149.95	dBase compatible, relational sorts
DataRetrieve	Abacus	79.95	accesses up to eight files simultaneously, indexes up to 80 fields, multiple font display, supports RAM disk, reporting
Info Base	Harvsoft	24.95	200-field records, custom print forms, runs under Amiga Basic
Info +	Eastern Telecom Inc.	49.99	multitasking, sorts any field, 32,765 records
Microfiche Filer	Software Visions	99.00	graphic interface, sorts on any field, IFF compatible, 200 to 400 address book records with 512K ►

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Organize!	Micro-Systems Software Inc.	99.95	dBase compatible, mathematical functions, relational sorts
Record Master	WoodSoftware	49.95	17,000 records, report generation, multiple key sorts
SoftWood File II	SoftWood Company	99.95	32-field records, 32,000 records per file, simple calculations, import of ASCII databases
SoftWood File IIsg	SoftWood Company	124.95	same as above plus: IFF sound and graphics compatible, phone dialer
Superbase Personal	Progressive Peripherals & Software	149.95	relational, IFF compatible, up to 999 indicies per file

Financial:

Product	Manufacturer	Price	Comments
B.E.S.T. Business Management	B.E.S.T. Inc.	$ 395.00	integrated modules: General Ledger, Accounts Receivable/ Payable, Inventory, Shipping/Receiving, Invoice, Billing, Checks
CCI Integrated Merchandiser	Clockwork Computers Inc.	499.00	point of sale, inventory control, full accounting, payroll
CCI Bottom Liner	Clockwork Computers Inc.	199.00	accounting transactions, project and resource files, payroll
Computerware Business Software	Computerware	99.00 ea.	separate programs for: Accounts Receivable, Accounts Payable, Payroll, General Ledger and Check Ledger
Financial Plus	Byte by Byte	295.00	general ledger, accounts payable/receivable, word processor
For-Trac	Eclipse Data Management Inc.	2,250.00	foreclosure tracking system for property investment
Investor's Advantage	Software Advantage Consulting Corp.	99.95 ea.	stock market tracking and stock selection
KEEP-Track	The Other Guys	299.95	general ledger, accounts payable/receivable, payroll
Lionheart Business Software	Lionheart Press Inc.	95.00 to 145.00	programs include: Cluster Analysis, Regression, Econometrics, Marketing Statistics, Sales and Market Forecasting, Inventories and Queues, Project Planner(call Lionheart for additional titles)
Nimbus 1	Oxxi Inc.	149.95	single entry, cash-based accounting system, general ledger, accounts payable/receivable
Rags to Riches	Chang Labs	499.95	three packages also available separately ($199): General Ledger, Accounts Payable, Accounts Receivable

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Rent-Pro	Eclipse Data Management Inc.	2,000.00	complete rental system: invoice, billing, account record maintenance, hourly-daily and daily-weekly versions
SoftWood Ledger	SoftWood Company	99.95	double-entry general ledger accounting system, balance sheet, income statement

Spreadsheets:

Product	Manufacturer	Price	Comments
Analyze!	Micro-Systems Software Inc.	149.95	8,192 × 256, pull-down menus, multitasking, four- and eight-color 3D or 2D graphs
Haicalc	Haitex Resources	59.95	9,000 × 9,000, accurate to eight digits, macros, multitasking, graphs
Logistix	Progressive Peripherals & Software	149.95	integrated: 2,048 × 1,024 spreadsheet, database, timesheet, presentation graphics, reads 1-2-3, dBase, DIF files
MaxiPlan 500	Oxxi Inc.	149.00	16,384 × 512, four -and eight-color graphics multitasking, speech, database, 1-2-3 file conversion
MaxiPlan Plus	Oxxi Inc.	199.00	above plus: macros, printer spooler, increased calculation speed
Unicalc	Lattice Inc.	79.95	8,192 × 256, non-Workbench, dual-window, import/export DIF files
VIP Professional	VIP Technologies	199.95	8,192 × 256, 1-2-3 work-alike and file compatibility, database graphs, more than 512K recommended

Word Processors:

Product	Manufacturer	Price	Comments
BeckerText	Abacus	150.00	dictionary, calculations within text, index generation, up to five column formatting, automatic hyphenation
DesignText	DesignTech Business Systems	79.00	speller, database and mail merge, graphics
Dynamic Word	MicroIllusions Inc.	199.95	speller, thesaurus, macros, multiple documents, page numbering, columns, color fonts, calculator
LPD Writer	Digital Solutions Inc.	119.95	multiple documents, spelling checker, mail merge, supports international keyboard layouts
ProWrite	New Horizons Software	124.95	multiple documents, graphics, color fonts, hi- or medium-res display ►

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  - —Data base (Index, Find, Lookup)
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- Maintain up to 16 data bases per spreadsheet
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Talker	Finally Software	69.95	full-function with speech synthesis by letter, word or sentence, fonts
Textcraft	Commodore	99.95	menus, templates, help tutorials, typestyles include superscripts and subscripts
TextPro	Abacus	79.95	30 definable function keys, automatic hyphenation, pull-down menus, graphics
VizaWrite	Progressive Peripherals & Software	149.95	resizable graphics, multiple documents, glossary system, import ASCII files
WordPerfect	WordPerfect Corp.	395.00	Amiga version of the IBM bestseller, thesaurus, dictionary, multiple documents, math capabilities, footnotes

Company List

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2201 Kalamazoo S E
PO Box 7219
Grand Rapids, MI 49510
616/241-5510

B.E.S.T. Inc.
11525 SW Durham Rd., Bldg. D
Tigard, OR 97224
800/368-BEST

Byte by Byte
Arboretum Plaza II
9442 Capitol of Texas Hwy. N, Suite 150
Austin, TX 78759
512/343-4357

Chang Labs
5300 Stevens Creek Rd.
San Jose, CA 95129
408/246-8020

Clockwork Computers Inc.
4612 Holly Ridge Rd.
Rockville, MD 20853
301/924-5509

Commodore Business Machines
1200 Wilson Dr.
West Chester, PA 19380
215/431-9100

Computerware
Box 668
4403 Manchester Ave., Suite 102
Encinitas, CA 92024
619/436-3512

Digital Solutions Inc.
30 Wertheim Court, #2
Richmond Hill, Ontario
Canada L4B 1B9
416/731-8775

Eastern Telecom Inc.
9514 Brimton Dr.
Orlando, FL 32817
305/657-4355

Eclipse Data Management Inc.
312½ Lafayette St.
Glendale, CA 91205
818/956-0766

Finally Software
4000 MacArthur Blvd.
Newport Beach, CA 92663
713/722-2922

Haitex Resources
208 Carrollton Park, Suite 1207
Carrollton, TX 75006
214/241-8030

Harvsoft
Box 725
Buffalo, NY 14207
716/877-3510

Lattice Inc.
2500 S. Highland Ave., Suite 300
Lombard, IL 60148
800/533-3577

Lionheart Press Inc.
PO Box 379
Alburg, VT 05440
514/933-4918

MegaSoft Limited
PO Box 1080
Battleground, WA 98604
206/687-7176

MicroIllusions Inc.
17408 Chatsworth St.
Granada Hills, CA 91344
818/360-3715

Micro-Systems Software Inc.
12798 W. Forest Hills Blvd.
Suite 202
West Palm Beach, FL 33414
305/790-0770

New Horizons Software
PO Box 180253
Austin, TX 78718
512/280-0319

The Other Guys
PO Box H
Logan, UT 85321
800/942-9402

Oxxi Inc.
1835-A Dawns Way
Fullerton, CA 92631
714/999-6710

Progressive Peripherals & Software
464 Calamath St.
Denver, CO 80204
303/825-4144

Software Advantage Consulting Corporation
37346 Charter Oaks Blvd.
Mt. Clemens, MI 48043
313/463-4995

Software Visions
26 Forest Rd.
Framingham, MA 01701
617/877-1266

SoftWood Company
PO Box 90331
Santa Barbara, CA 93190-0331
805/966-4662

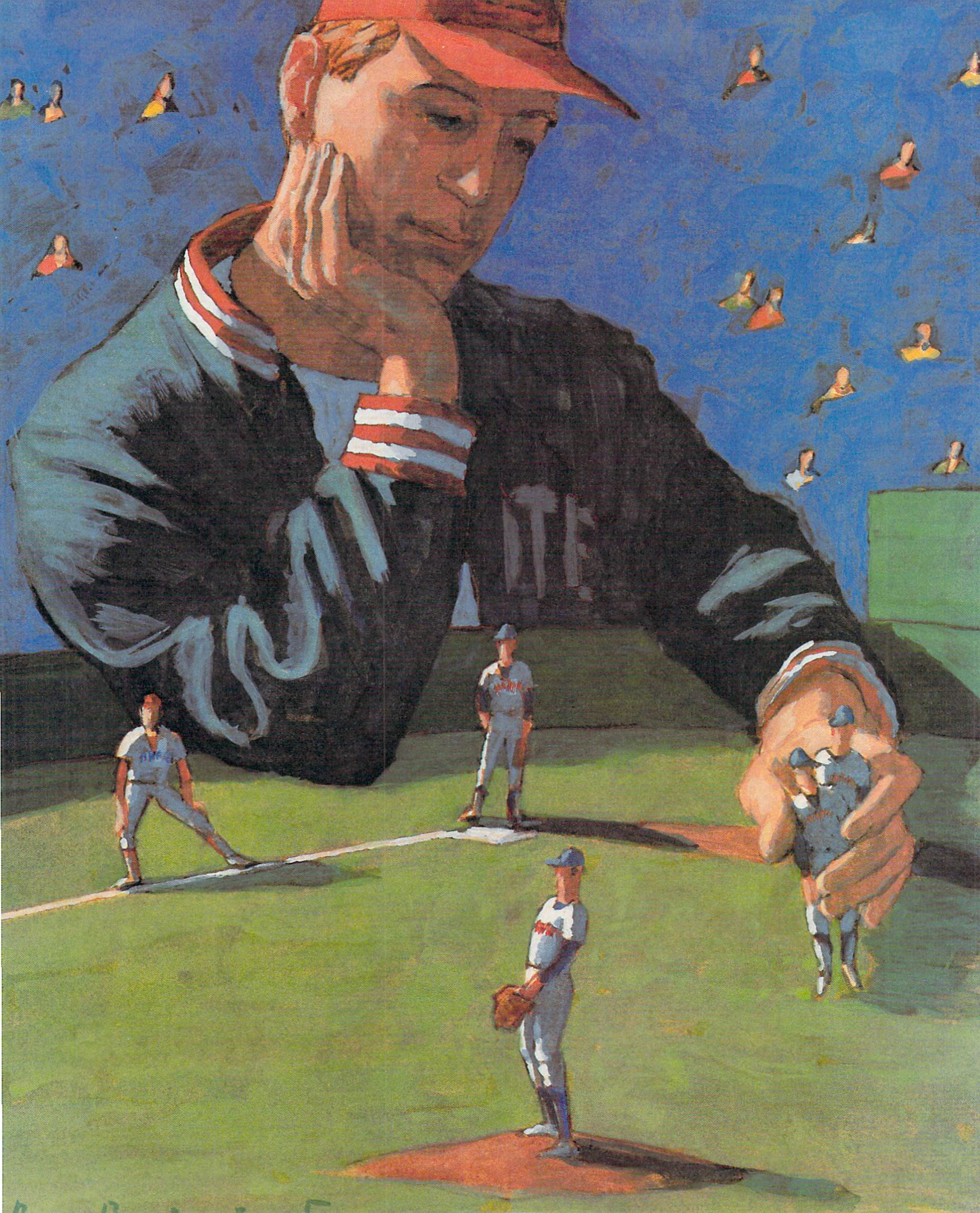
Transtime Technologies
797 Sheridan Dr.
Tonawanda, NY 14150
716/688-9296

VersaSoft Corporation
4340 Almaden Expwy., Suite 250
San Jose, CA 95118
408/793-9044

VIP Technologies
2651 Johns St. Unit 3
Markham, Ontario
Canada L3R 2W5
416/479-1990

WoodSoftware
PO Box 16193
Wichita, KS 67216
316/529-1861

WordPerfect Corporation
288 West Center St.
Orem, UT 84057
801/227-4420



Boot Me Up to the Ballgame

Stop second-guessing the Major League managers and start calling plays for your own team. Can you *beat the winningest manager in baseball?*

The wind at Candlestick was blowing in from right as Bench stepped to the plate—ninth inning, two on, two out, National League All-Time Greats down by two. Before Johnny settled into the box, however, AL Manager Earl Weaver was on the mound, taking the ball from Herb Score and signalling his bullpen for Walter Johnson, the famous Senators' right-hander. By the time Johnson finished his warm-ups, though, Bench was on the bench. Playing the percentages, NL Manager Bob Ryan sent lefty Willie McCovey to bat against The Big Train. McCovey smashed the first pitch over the head of right-fielder Babe Ruth. Already around first, and into his home run trot, McCovey could only watch in disbelief as the wind off San Francisco Bay held the ball up long enough for The Babe to snatch it out of the stands. Ryan shook his head; he'd made the percentage move, but Earl had remembered the wind.

Bringing your baseball fantasies to life is easy with Earl Weaver Baseball, the latest Amiga game from Electronic Arts. Earl Weaver Baseball puts you into the dug-outs and onto the diamonds of the most famous ballparks in the world—places like Tiger Stadium, the Polo Grounds and Wrigley Field—and lets you hit, run, throw and manage your way to baseball glory. If you've been looking for the ultimate computer baseball game, your search is over.

Not content to produce an arcade game *or* a strategy game, Electronic Arts did both. The arcade game lets you control your pitchers and batters and, to a limited extent, your fielders (you select the base they throw to). The strategy game—the heart of Earl Weaver Baseball—lets you manipulate a lineup of big leaguers in a battle of wits against a friend or against a computer opponent designed to act and react like Earl Weaver, one of the winningest managers in Major League history.

Warming Up

Earl Weaver Baseball comes on a Workbench disk and uses Electronic Arts' key-disk copy-protection system. You can copy the disk, but you must insert the original disk for a short time whenever you play the game. After the title screens and credits (displayed to the strains of "Stars and Stripes Forever"), the Main menu screen appears.

Rather than using pull-down menus, you choose your options on the menu screen by clicking on the desired item. The choices let you tailor the game the way you want and to access utilities for running your own leagues. The most important options fall under Ground Rules. Here, you pick the stadium for the game, indicate whether or not you want to use a Designated Hitter, and choose between the arcade game and the regulation game.

Earl Weaver Baseball comes with 32 predefined ballparks. You can either play at one of these or design your own. The 32 built-in parks include famous major-league parks of the past and present and a couple of fantasy parks. The choice of ballpark greatly influences the play of the game. A 320-foot fly ball to left field in Fenway Park is a home run; it's just another out in most other stadiums.

If you click on Arcade in the Ground Rules, the computer will determine your lineup and you won't be able to make substitutions. The player's performances will exactly match their historical statistics. In Regulation mode, a player's performance over a lot of games will generally match his historical performance, but his playing in any one game ►

By Bob Ryan

ILLUSTRATED BY BARRETT ROOT

Earl Weaver on Earl Weaver Baseball

HE WAS EJECTED from 87 regular-season games in the major leagues, one World Series game and even one game during spring training. He was once suspended and fined $2,000 for "making physical contact" with an umpire (which prompted him to fire off his famous press statement, beginning "Lee McPhail [then president of the American League] has again been kind enough to grant me seven days' vacation. . ."). Another time he picked up third base during an argument with an umpire and carried it into the clubhouse. And once, as an acknowledged master of the Rules of Baseball, he took that sacred tome onto the field and tore it up page-by-page to express his opinion of a certain umpire's lack of erudition in such matters.

But no one since Joe McCarthy, who skippered the invincible New York Yankees of the 1920s, has ever compiled a better record as a big league manager than Earl Weaver did with the Baltimore Orioles. From 1968, when he took over for the Birds, until his first retirement 15 years later, he compiled a .596 winning percentage. A tough, combative opponent (as his many spats with umpires and league officials attest), Weaver was also one of the more-respected and well-liked (even by a number of umpires!) individuals ever to be part of organized baseball. Here, Earl shares his thoughts about the game that bears his name.

AW: How did you get involved with Earl Weaver Baseball?

Earl: Electronic Arts approached me to lend my expertise to the game. They wanted the game to be as close to Major League baseball as possible.

AW: How did you contribute your expertise to the game?

Earl: I took the playbook I'd used as manager for the Baltimore Orioles and went through it in detail with the people from EA. I explained how cutoffs worked, how to position the defense, things like that. I talked a lot about situations, when I'd steal and when I'd change a pitcher. It was like taking a major league club to spring training—well, maybe not a major league club, they've been through a lot of spring trainings. It was more like talking to rookies: I explained everything very carefully.

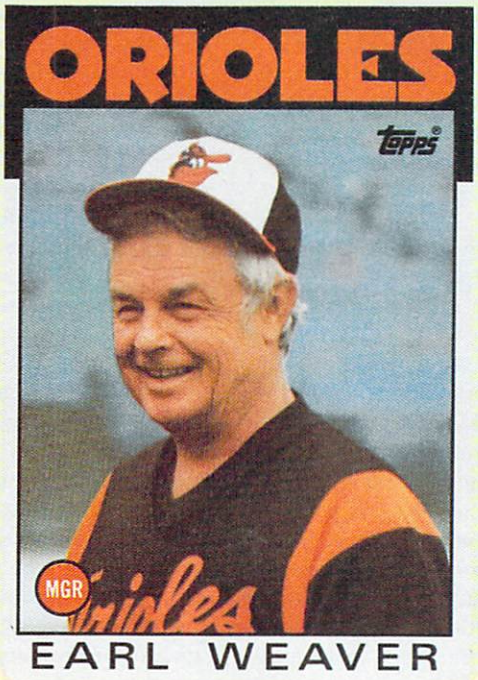
AW: How does the game compare to managing a major league team? Does it include most of the options you had as a manager?

Earl: Yeah, the game lets me do just about anything I could do with the Orioles. For instance, if we need a run in the eighth inning and (Rick) Dempsey gets on first, I've got Alan Wiggins on the bench, whose got a much better chance to steal second than Dempsey. So I can substitute as I could with the Orioles, or pitch around a batter, or call a run-and-hit. EA got me for my experience and expertise, and they used it.

AW: Does the game reflect the way you managed?

Earl: When you use "Earl Manages," it does, but that doesn't mean you *have* to manage my way. You can "Ask Earl" for advice, but you don't have to take it. If you want to bunt in the ninth inning down by six runs, you can.

I think the game will be used for leagues, and I think the real fan isn't going to ask my advice. The game has my name on it, but it's baseball the way you want to play it. You play your own game and make your own decisions.



At this point Earl had to leave us. As much as he loves to talk baseball, he has developed one other enduring passion over the years: Earl had to hurry because he was due on the first tee in 10 minutes.□

—B.R.

depends upon more than stats—random chance, the quality of the opposition and the game situation also affect him. For instance, Ty Cobb won't hit .420 if the only pitchers he faces have ERAs under 2.00. While the arcade game is good, I don't play it any longer. The regulation game is the way to play.

Earl Weaver Baseball comes with eight built-in teams composed of National and American League All-Stars from four periods from 1900 through 1975. The stats that form the basis of a player's performance are not lifetime stats, but the stats from the player's best (or nearly best) year. Any team can be designated the home or visiting team. After choosing the teams, you indicate how they're to be controlled (mouse, joystick or keyboard) and who is to manage them. You can mangage a team, play and manage (you control hitting, pitching and fielding as well as your lineup) or let Earl manage the team. For two-player games, you'd pick You Manage or Play & Manage for both sides. To play against Earl, click on Earl Manages for one of the teams. To have the computer play itself, select Earl Manages for both teams.

The game's four difficulty levels, from Sandlot to Major League, apply to Play and Manage games only. The Pitching Styles options determine the length and complexity of the game. In One Pitch, only the key pitch of an at-bat is played; with Full At Bat, every pitch of a game is thrown.

The final team option is League/Non-League. Since Earl Weaver Baseball lets you form and operate your own leagues, playing a League game means that injured players and tired pitchers aren't available to you. In non-league games, you can use your entire roster.

Once the teams and Ground Rules are established, click on Play Ball and begin. In Arcade mode, the computer determines the lineup and play commences immediatly. In Regulation mode, you have to make out your lineup from the team roster. If you need help, you can "Ask Earl" for suggestions. In League play, players unavailable due to fatigue and injury are ghosted in the roster. Once you and your opponent have selected a lineup, the fun begins.

In Arcade mode and in the Play & Manage mode of regulation games, you control the players' actions. I prefer to play regulation games where all I do is call plays and make substitutions. This puts me squarely into the shoes of a major-league manager, making for a truer simulation.

Batter Up

For the ballgame, you switch to a beautiful color graphics representation of the park you've chosen. The display is a split screen; most of it shows the field, while a vertical strip on the right shows a closeup of the pitcher and batter. The animation is very good—especially the closeup of the pitcher's windup. The digitized sounds used for crowd noise, the crack of the bat, and the umpires' calls are excellent. A lot of attention has been paid to the presentation of this game—down to such small details as the sound a foul ball makes when it hits the screen behind the plate, the rotating baseball's seams and the way the umpires signal fair and foul. The graphics and sound are a great complement to the game.

Before any pitch, whether your team is batting or in the field, you can activate the Strategy menus. From here, you transmit your managerial decisions to your players. Your options reflect just about all the moves available to a major-league manager. For instance, on defense you shift the depth and position of your infielders and outfielders, you can hold a runner, pitch around a batter, or pitch out if you suspect a play is on. (Pitch out four consecutive times and you've thrown an intentional walk.) You can even guard the lines or charge from first or third. If your pitcher's in trouble, you can have a conference ►



How the Sox Won the '86 Series

By Dan Sullivan

```
Red Sox 2, Mets 0

Boston                        New York

Boggs 3b     4 0 2 0  Dykstra cf 4 0 1 0
Barrett 2b 5 1 3 0  Backman 2b 4 0 0 0
Rice lf      4 1 1 2  Hrnandz 1b 1 0 0 0
Evans rf     4 0 0 0  Strwbry rf 4 0 0 0
Buckner 1b 4 0 1 0  Carter c     4 0 1 0
Gedman c     3 0 1 0  Knight 3b   3 0 2 0
Hendrsn cf 4 0 0 0  Mitchel lf 3 0 0 0
Owen ss      4 0 3 0  Santana ss 4 0 2 0
Clemens p   2 0 0 0  Gooden p     2 0 0 0
Grnwell ph 1 0 0 0  Johnson ph 1 0 1 0
Schirldi p 1 0 0 0  Wilson ph   1 0 0 0
                      Mazzili ph 1 0 0 0
                      Teufel ph   1 0 0 0
Totals     37 2 11 2             33 0 7 0
Boston     000 000 020-2
New York  000 000 000-0
  Game-winning RBI-Rice
  E-Owen, Mitchell. DP-Boston 2, New
York 2. LOB-Boston 8, New York 9. 2B-
Owen, Santana. HR-Rice.

Boston       IP  H  R ER BB SO
Clemens       6  4  0  0  3  5
Stanley-W    1  2  0  0  1  0
Schiraldi-S 2  1  0  0  0  1

New York     IP  H  R ER BB SO
Gooden        7  8  0  0  1  4
McDowell-L  1  2  2  2  0  0
Orosco      2/3 1  0  0  0  0
Aguilera    1/3 0  0  0  0  1

  Stanley pitched to one batter in
eighth. HBP-Boggs by Orosco. Umpires-
Home, Harvey; First, Phillips; Second,
C. Williams; Third, Evans; LF, Davis;
RF, Barnett. T-0:41. A-7.
```

BOB STANLEY gets the win in the final game of the World Series? Jim Rice hits a clutch homer to break a scoreless tie? Bill Buckner makes two key defensive plays and stops a rally? Calvin Schiraldi picks up the save with two strong innings of relief?

If you're a Boston Red Sox fan you would probably howl in disbelief at such improbable happenings. If you're *not* a follower of the Red Sox, you most likely don't understand the pessimistic masochism of the Fenway Park fan. After all, the Sox always find a way to lose the big game or to make the wrong decision. Didn't they sell Babe Ruth in 1920 and give the Yankees an undisputed claim to the American League pennant for the next 20 years? Hadn't they lost a heartbreaking seventh game to the Reds in the 1975 Series? Wasn't it a 98-lb. weakling named Bucky Dent who crushed their dreams in 1978? And will they ever forget the debacle of The Sixth Game in 1986?

Yet, all of that collective misery was dispelled for one brief afternoon this year in the offices of *AmigaWorld*. Our staff re-enacted the crucial sixth game of the 1986 World Series with Earl Weaver Baseball. We gave the Mets a big advantage by choosing "Earl Manages" for the Mets (surely an edge over the indecisive Davey Johnson). *AmigaWorld* Tech Editor Bob Ryan subbed for John McNamara with the Red Sox.

It was a classic pitchers' duel for the first seven innings. Dwight Gooden pitched his way out of several jams, scattering seven hits as the Red Sox stranded seven runners in as many innings. Roger Clemens pitched superbly for six innings, giving up only three hits and three walks.

Manager Ryan chose to pinch hit for Clemens in the seventh after Spike Owen beat out an infield hit to open the inning. Ryan's first big managerial move backfired as Ed Romero forced Owen at second and Wade Boggs bounced into a 3-6-4 double play. The *AmigaWorld* staff groaned as Ryan courted further disaster by bringing in Bob Stanley to pitch the seventh.

Santana grounded out to begin the inning, but then Earl pinch hit Howard Johnson for Gooden, and HoJo stroked Stanley's first pitch for a single to center. Dykstra followed with another hit; suddenly there were two on and only one out. The next batter, Wally Backman, lined a hard shot towards the middle, but Marty Barrett backhanded the ball nicely to turn a 4-6-3 double play. Disaster averted . . . at least for the moment.

But then the sun seemed to shine for the Red Sox in the top of the eighth. (Although, of course, it was after 11 pm on a cold October night in New York.) Earl chose Roger McDowell to pitch for the Mets in the eighth inning, but Weaver's genius seemed to desert him as Barrett ripped a curve ball to left center for a single to open the inning. Jim Rice, a certain future Hall-of-Famer but a man some Sox fans think never delivers the clutch hit, came to the plate.

Rice took a fastball high and tight for ball one. McDowell had him set up to break a slider down and away on the next pitch. But that ball, however, hung up and over the plate for a split-second too long and Rice drilled it deep over the left-field wall to bring complete pandemonium to the *AmigaWorld* offices. Rice had finally delivered the big blow.

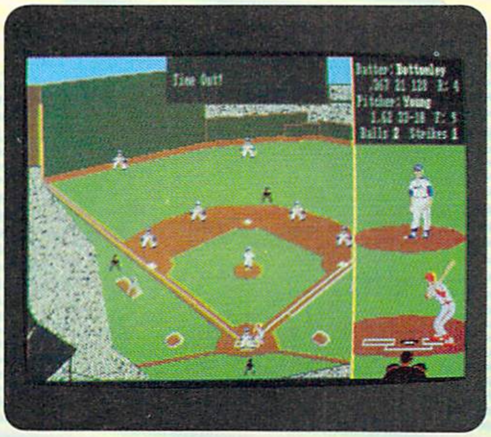
Danger, of course, still lurked (as any Sox fan knows in his or her heart) because the Mets still had six more outs. Keith Hernandez walked to open the eighth, and manager Ryan promptly yanked Stanley (sigh of relief) . . . only to bring on the erratic Calvin Schiraldi (gasp of anxiety). But Calvin was the stopper, as Earl's pinch hitter, Mookie Wilson, bounced into a fielder's choice and Gary Carter grounded into a double play.

Schiraldi was even tougher in the ninth, setting down Ray Knight and pinch hitter Lee Mazzilli on only two pitches. Santana kept things alive with a slap single to center. Earl played his last card by pinch hitting Tim Teufel for reliever Aguilera, but Calvin bore down and blew a fastball by him for a swinging third strike. The Red Sox had won the Series for the first time since 1918.□

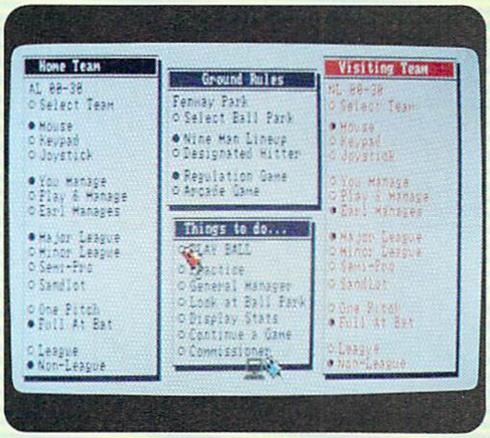
on the mound, warm up a reliever in your bullpen, call for a reliever and make defensive substitutions. Offensive options include calling for bunts, hit-and-run plays (and run-and-hit plays), steals and squeezes. You can force the batter to swing or to take a pitch. Of course, you can always send in a pinch hitter. To be a successful manager, you'll have to learn to match the proper play with the right situation and personnel.

The only drawback to the strategy menus is when you're playing against a friend. One player has to close her eyes or turn away while the other makes his moves, a clumsy system at best.

Often times while managing, you won't have much to do: Your batters will be hitting away and your fielders will be playing it straight. Even then, though, the game is exciting because you're watching the lineup you chose in action, waiting for the opportunity when your play calling will make the difference.



The playing field with close-up of pitcher and batter.



The Main menu.

The Front Office

The fun of Earl Weaver Baseball extends beyond the diamond. The program contains all the utilities you need to run your own Earl Weaver Baseball League. Under the Things To Do menu you can examine the various ballparks, display player stats, practice your arcade skills or continue a saved game. Of utmost importance, however, are the Commissioner and General Manager options.

The Commissioner menu gives you the power to create new leagues, each with a different divisional structure, and populate them with teams. You can either copy a team from existing leagues or create one from scratch. Either way, you get to pick the team's name, its colors and its home stadium. You can use one of the supplied stadiums or modify it. For example, I think that Royals Stadium is a great ballpark but I hate artificial turf. When I chose Royals Stadium as my home ballpark in the *AmigaWorld* League, I simply changed the surface from artificial to natural. If I'd wanted, I could have easily created a new stadium from scratch.

Once the teams have been specified, you need to fill them with players. With the *AmigaWorld* League (the Bobbos, the Shawnos, the Sullys and the Lindas), we used the General Manager option to hold a draft of players from the 1986 Major League season. (The '86 Teams disk is available from Electronic Arts for $17.95.) It is nearly as much fun to stock a team with a group of complementary players as it is to play the game. Once your teams are complete, you can create a league schedule and begin the season.

If you're unhappy with your team's performance (the Sullys have a collective batting average of .209), you can trade, create and edit players in the General Manager mode. In creating a player you see the complexity that underlies Earl Weaver Baseball. You can enter up to 35 stats for pitchers, including different stats for right-handed and left-handed hitters and batting stats, and up to 44 stats for other players including *their* performance against both right-handed and left-handed pitchers! I've never seen such a wealth of detail in a baseball game. Earl Weaver Baseball not only surpasses all other computer baseball games, it has made me put away my copy of APBA baseball, a board game that I've played since high school.

You've been working hard; you owe it to yourself to try Earl Weaver Baseball—especially if you love the summer game. Get together with some friends, start a league and have a good time. I'd write more, but I've a crucial series scheduled against the Lindas. See you at the ballpark. ■

Earl Weaver Baseball
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
415/571-7171
$49.95
512K required.

GRAPHICS
THAT WON'T STAND STILL

Part II

of a programming tutorial on learning

to animate BOBs and Virtual Sprites with C.

By David T. McClellan

Here in Part II of our animation tutorial we get down to the nuts and bolts of program initialization and shutdown. Last month we set up the imagery we will be moving about in Part III; now we set up everything else you will need to run our sample animation program, *pigs.c* (Listing 1). Next month we will perform the actual moving and collision detection as well as offer some hints on how to handle more complex and fast-moving animations.

Before describing the setup code, we will examine further the Gel data structures introduced in Part I, specifically, the GelsInfo, VSprite and BOB structs. The GelsInfo structure contains general information about our program's VSprites and BOBs. For our purposes, GelsInfo will tell the Amiga how many of the hardware sprites we will reserve (none) and where our collision handler routines will be. The Amiga graphics kernel also stores some information, such as color sets, in the GelsInfo structure. It is created by our getGelsInfo() routine, which we will discuss later.

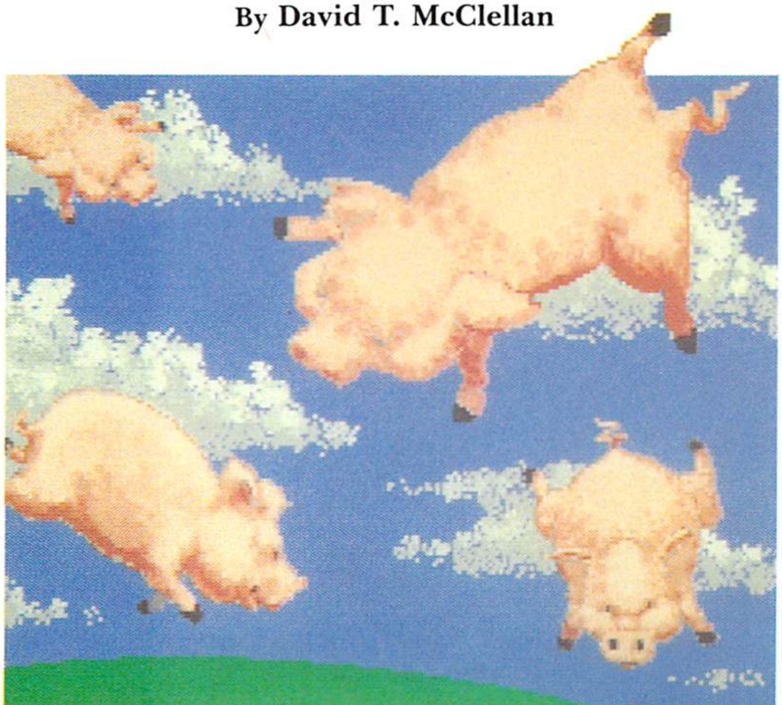
In Part I we examined VSprite and BOB data structures in terms of the images they display. There are, however, other aspects of these structures that are equally critical to realistic animation, namely, movement control and collision detection. Let's look at these more closely, beginning with VSprites (which are less complex than, and share some of their information with BOBs).

VSprite Fields

The Amiga requires more information about a VSprite than merely its position and image array. Take a look at its definition in the C include file *graphics/gels.h* (Figure 1); there are quite a few fields in the struct, some to be used by the programmer and some by the system. Those of immediate concern to us are: Flags, MeMask, HitMask, CollMask, BorderLine and VUserExt.

Flags tells the system whether the VSprite is a separate Gel in itself or a part of a BOB. (BOBs use some additional bits in Flags, but we will discuss that later. Also the kernel may set two bits of its own in Flags if necessary.) A VSprite's Flags VSOVERFLOW bit will be set if there are too many other VSprites on a scanline for this one to be displayed; its GELGONE bit will be set if the VSprite (or its BOB) has moved outside the clipping region and will not be drawn. Your program can inspect these flags and act on them. To initialize a non-BOB VSprite, always set Flags to VSprite.

The collision fields —CollMask and Bor- ►



ILLUSTRATED BY ROGER GOODE

derLine—describe the VSprite's outline to the kernel for rapid detection of collisions with screen borders and with other Gels. The CollMask field is determined by performing the logical-or operation on the bit planes of the image. Results are stored in a rectangular array (see below).

The BorderLine field provides a quick, one-line boundary for the VSsprite/BOB. The BorderLine field's value is determined by "compressing" the two-dimensional CollMask array into a one-line bitmask. To compress the CollMask assign a 1 to the BorderLine wherever one or more 1's appear in the corresponding CollMask column; if there are no 1's assign a zero (0).

For example, after blanking out the 0's outside the 1's, the VSprite's image looks like this:

Plane 0	Plane 1
1	0
101	0
1000001	111
101	101
1	1

The VSprite's CollMask and BorderLine would then be represented as follows:

```
  CollMask
     1
    101
  1011101
    101
     1
-----------
1011101 = BorderLine
```

The MeMask and HitMask fields allow you to select which type of collision you want to detect and handle. HitMask indicates with what class of Gel your VSprite can collide, and MeMask indicates what class of Gel your VSprite is so other VSprites can specify it in their HitMasks. Bit 0 of HitMask tells the kernel to check for boundary collisions (the only kind done in this tutorial), while bits 1–15 indicate, according to your specification, other classes of things to hit.

For each bit set, there must be a routine attached to the GelsInfo struct via SetCollision(). This routine will be called with pointers to the offending Gels when a collision occurs that matches your MeMask/HitMask criteria. There can be up to 16 collision routines, one for each bit. Our routine getGelsInfo() simply sets handler 0 for boundary collisions. We will separate our BOBs and VSprites by vertically spacing them and thus avoiding inter-Gel collisions completely; perhaps a cheap trick, but it works. If you were designing a game, you would, of course, want a variety of inter-Gel collisions as well. In Part III we will examine in more detail both kinds of detection and the function of the collision handler.

At the end of the VSprite struct is a user-specified data structure. It is created by defining the name VUserStuff to be "struct <your struct>" before including *gels.h* (see the include file listing, *pigs.h*, line 46). In this case VUserStuff is defined struct my_Vinfo. This struct is not used by the kernel; we use it to keep special information for each VSprite. In our example it contains movement information and a pre-VSprite id to be used by the collision handler.

Figure 1. The definition of the VSprite structure.

```
struct VSprite
{
    struct VSprite    *NextVSprite;
    struct VSprite    *PrevVSprite;
    struct VSprite    *DrawPath;
    struct VSprite    *ClearPath;
    WORD OldY, OldX;
    WORD Flags;
    WORD Y, X;
    WORD Height;
    WORD Width;
    WORD Depth;
    WORD MeMask;
    WORD HitMask;
    WORD *ImageData;
    WORD *BorderLine;
    WORD *CollMask;
    WORD *SprColors;
    struct Bob *VSBob;
    BYTE PlanePick;
    BYTE PlaneOnOff;
    VUserStuff VUserExt;
};
```

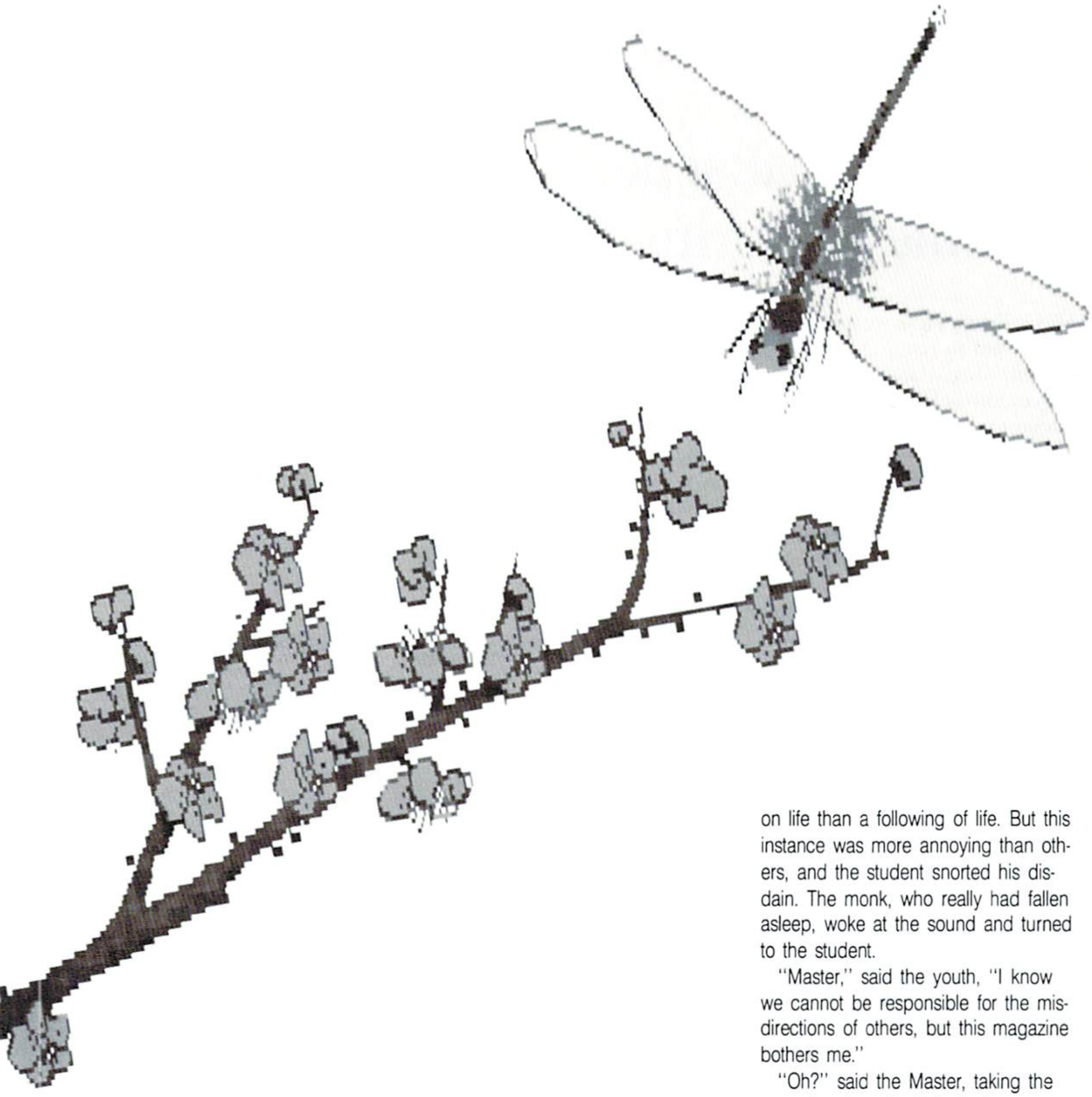
BOB: A More Complex Guy

BOBs are more intricate than VSprites and thus contain more information. In addition to the aspects of VSprites described above, BOBs also use those parts of the VSprite Flags not used by the VSprites themselves. A BOB keeps a few arrays for storage and image manipulation: SaveBuffer saves the background, while DBuffer will do the same should you need to use double-buffered screens (see sidebar on double buffering).

The BOB has flags for its own Flags field (for use with AnimComps), as well as two special VSprite flags, SAVEBACK and OVERLAY, which we will use in our tutorial. Set SAVEBACK to save the background pixels that the BOB overlays in its SaveBuffer, allowing the background to be restored each time the BOB moves; if you do not, the BOB will act like a paintbrush and smear across the background as it moves. Use OVERLAY if you wish the BOB to be drawn like a VSprite with transparency, color 0 being tranparent, enabling the background image to show through. If not, color 0 will simply be an extra BOB color.

This Looks Like a Setup

To initialize our data structures, we begin (after opening the libraries) by setting up a Screen and Window within which to run our animation. To keep as much control as possible, we use a CustomScreen/Custom BitMap screen with a non-resizable, borderless window. Other than allocating the BitMaps and setting flags, we will set up these two structures in similar fashion to the Screen and Window setup in Vincent Hopson's article ►



Call for Authors

The Taoist monk and the student sat beneath a naked cherry tree, its summer leaves long fallen. Gray sky and chill wind, mist more than rain dampened the ground, dampened their silk robes, numbed their posteriors. The student fidgeted while the monk, eyes half closed, enjoyed the sensations. Cold buns are, after all, another element of existence.

After a time, the student grew bored, and thinking that the monk had fallen asleep, pulled a magazine out of his robes and began to read. The student, trying very hard to keep "the uncut stone" in mind while he read, soon thought he had encountered a deviation from the Way. This was not uncommon. Most things done by Westerners were more of an imposition on life than a following of life. But this instance was more annoying than others, and the student snorted his disdain. The monk, who really had fallen asleep, woke at the sound and turned to the student.

"Master," said the youth, "I know we cannot be responsible for the misdirections of others, but this magazine bothers me."

"Oh?" said the Master, taking the magazine from the lad. He began to flip carefully through the pages.

"Yes," said the student. "I have a subscription, and for the most part, I find the magazine useful. For a magazine, it is an unusually enligthened publication. But some of these articles seem to have as little substance as the clouds that drift over the summer garden."

"Did you read this interview with Andy Warhol?" asked the monk.

"That is what I mean! I wish to understand my Amiga like I wish to understand life. You teach me about life and the magazine is supposed to teach me about the Amiga—not MTV, Warhol, or what might happen sometime in the future!"

The monk thought for a moment, then motioned the student to follow him. Together they walked the miles back to the temple where the monk lived. The student followed the monk down long halls where he had never dared go before. Finally, they entered the monk's humble cell. It was stark, cold and simple, but on the floor in the very center of the room was an Amiga computer. The monk knelt before the computer and booted up a word processing file. It was an article. "Zen and the CLI" was the title. It was neat, double spaced, and included the monk's name, address, phone number and Social Security number. As the student read, the monk pulled out a copy of the *AmigaWorld* author's guidelines.

"I sent a self-addressed stamped envelope to:

AmigaWorld
Submissions
80 Elm Street
Peterborough, NH 03458

and as night follows day, I received the guidelines. When I finish the article, I will send it to the same address and wait patiently six to eight weeks for a reply.

"If you feel that the content of *AmigaWorld* deviates from the true path to complete understanding, then don't just complain. The sharing of knowledge so that others may benefit is but another step on the endless road. Just because one enjoys life for what it is does not mean that one cannot take a hand in its future form."

The student, recognizing wisdom when he heard it, bowed deeply before the monk.

Outside, in the still temple courtyard, the rain had stopped.

In the wind were the faint echoes of one hand clapping.

Get Instant Relief from Screen Headache . . . with Double Buffering

IN OUR SAMPLE listing *pigs.c* we are able to update things fast enough not to require double buffering because we are not making a large number of changes to the screen that could result in flicker or glitches. However, if you attempt more complex animation programs, you may need to use this technique.

Set up a double-buffered screen by allocating two BitMaps for the screen, each to be drawn every other frame. While the Amiga draws one BitMap, you update the other. Then, while you are between screen updates, swap the screen's BitMap pointer to the newer BitMap.

You must set the Screen's RastPort.Flags DBUFFER flag to indicate double buffering to the Amiga and then initialize the DBuffer field of each BOB. The BOB DBuffer field points to a DBufPacket struct that points to an array sized to hold the BOB with *its* BufBuffer field. The array must be ((BOB_WIDTH + 15)/16) * BOB_HEIGHT * BOB_DEPTH words, allocated in chip memory. Set these fields and the kernel will use them at image-draw time (which we will cover in more depth next month). The Addison-Wesley manuals cover this procedure in some detail.□

"Creating Menus with Intuition" in the Jan./Feb. '87 issue of *AmigaWorld*.

Setting up the BitMaps is easy. First, we allocate a BitMap struct with AllocMem() (in chip memory so the graphics system can access it) and initialize it with InitBitMap() to reflect the width, height and depth of our BitMap (320 × 200 × 3). Then we allocate the bit planes themselves, using AllocRaster(), clear them with BitClear() and attach them to the appropriate raster pointers in the BitMap struct. There is one raster for each plane of DEPTH in the Screen (three, for eight colors); each is WIDTH by HEIGHT bits (see *pigs.h* for these constants). AllocRaster() allocates the memory for the rasters in chip memory where the blitter can see them. Like the AllocMem(), it does not record the size of the raster anywhere, so when we free a raster using FreeRaster(), we must remember its size.

Next we attach the BitMap to the NewScreen struct, initialize the Screen with OpenScreen() and set our chosen colors with SetRGB4(), which sets one color register at a time. Then we initialize the fields of the NewWindow struct to allocate a window that is the size of the screen, borderless, with only its Close gadget turned on and its minimum and maximum sizes set to the same value. This prevents resizing, making drawing and command interpretation much easier.

One further note: You will see that after allocating and opening things, we set new bits in the long int closemask. These bits tell the closeupshop() routine what has been done so far, so that if we get an error further down the road and quit, the closeup routine will only close and free initialized things. This makes cleanup much easier when an error occurs in mid-setup.

Once the Screen and Window are ready, we can allocate the Gels (VSprites and BOBs). First, initialize a GelsInfo struct to point to them by using the getGelsInfo() routine (line 241 of the listing). The routine takes as an argument a RastPort to which the GelsInfo struct will be attached. Once called, the routine allocates memory for the various parts of the GelsInfo that need it (including dummy VSprites for the head and tail of the list), sets boundaries and flags and attaches the GelsInfo to the RastPort passed in.

Note that the routine allocates memory in the PUBLIC address space for shared use with the kernel routine, and that the sprRsrvd field is set to OxFFFF, indicating that we are not reserving any hardware sprites for ourselves. If another application requires such sprites, pass the reserved sprites in as a parameter. Note also that getGelsInfo() requires a specific, external, user-provided routine named bndcol_hdlr(). This routine is passed to SetCollision to handle boundary collisions (mentioned above in the section on VSprite fields and which will be covered in greater detail in Part III).

It's All Routine(s) From Here

After setup() gives us our GelsInfo struct, we can create the VSprites and the BOB with two other utility routines, getVSprite() and getBob(). getVSprite() takes as parameters the height, width, depth, image array, colors, initial position and Flags settings for a VSprite and allocates one. The routine can be called by both setup() and by getBob(); getBob() uses it to allocate the BOB's VSprite and is the main reason for passing in the Flags argument. getBob() provides the same service for BOBs; it takes a BOB's height, width, depth, image, PlanePick, PlaneOnOff, position, VSprite and BOB Flags, and then creates a BOB.

After allocating the VSprites, we use setup() to initialize their VUserStuff fields with information enabling us to move them later. We then add them to the system list, using AddVSprite(). Use AddBob() to achieve the

continued on p. 102


CHWAST

BASIC for Pros

Professional developers are finding BASIC is no longer a poor relation among programming languages.

By Louis R. Wallace

Although BASIC has always been the most popular programming language for the rank-and-file microcomputer user, professional programmers have generally dismissed it as a serious development tool. Yet, as more powerful personal computers like the Amiga come on the scene, BASIC's critics may have to take a revisionist stance.

The BASIC used in programming today's advanced microcomputers has little in common with its early roots. An advanced personal computer such as the Amiga has an equally advanced Microsoft Basic interpreter. In conjunction with the Absoft Basic compiler, Amiga Microsoft Basic offers a powerful development tool. In addition, other forms of BASIC—such as True BASIC—have evolved to strengthen BASIC's appeal to developers.

We will examine these two languages—Amiga Microsoft Basic (along with the Absoft compiler) and True BASIC—in relation to the requirements of a professional development language and see how well they meet the needs of the serious amateur as well as the professional developer.

Amiga Basic/Absoft Compiler

AMIGA BASIC is a full implementation of the latest advances in Microsoft Basic language; it is virtually identical to the QuickBasic compiled language for the IBM PC and its clones, as well as to the Microsoft Basic system for the Macintosh. Amiga Basic offers many of the features one would expect in a development language, such as structured programming techniques, I/O communication to several types of devices, high-level data-file manipulation commands, single- and double-precision mathematics, high-resolution graphics (including many Amiga-specific graphics features such as animation), sound commands, event processing and, to a small degree, declarable variable types.

The Absoft Amiga Basic compiler is an extremely powerful BASIC compiler for the Motorola 68000 computers. It is an optimizing compiler, which means it generates especially fast, efficient machine code. It also allows you to access the entire memory available to the Amiga, and the compiled programs it creates are stand-alone, executable files. The required overhead for each program is only 48K, which compares favorably with the nearly 200K used by the interpreter. In addition, the compiled programs work effectively in the Amiga's multitasking environment. For our purposes, all references to Amiga Basic as a serious development tool should be understood to pertain to the combination of the Amiga Basic interpreter *and* the Absoft Amiga Basic ►

ILLUSTRATED BY SEYMOUR CHWAST

compiler. Some special features of the compiler, however, that are not found in the interpreter itself will be distinguished where applicable in our discussion.

Structural Strength

One of the more powerful aspects of Amiga Basic is that it allows for structured programming techniques. Gone is the "spaghetti code" of earlier BASIC, where the combination of an interpreted language with little structured programming capabilities and generally inexperienced, self-taught programmers resulted in programs the logic of which resembled a heaping plate of Mama Leone's best bolognese. With Amiga Basic you can create the highly-structured, highly-organized programs available in C or Modula 2 by using the subprogram modules allowed. In addition, line numbers are not necessary, as both subroutines and subprograms can be referenced by labels.

Subprograms are key elements in developing logical, ordered programs. A subprogram differs from a subroutine in that it is the equivalent of a programmer's "black box." You design a routine or set of routines to accomplish a specified purpose in a particular program. A subprogram is similar, except that it can be used over again by including it in any number of different programs. Once the subprogram has been designed and debugged, it can be referenced without knowledge of internal operations. You need only to pass the proper variables in the proper order and CALL the subprogram and it will perform its defined function and return data or results back to the main program, if applicable. Unlike subroutines, subprograms cannot execute accidentally; they require an explicit CALL before they will begin execution.

One of the strengths of subprograms is that the variables within it are local variables, meaning they have no effect on the main program even if the variables in the subprogram share the same names with variables in the main program. If you wish, however, you can declare variables to be shared with the main program.

The Absoft compiler offers a useful addition to subprograms, namely, recursion, which is the ability of a subprogram to call itself. This capability is not supported by the interpreter alone, but is available when you use the compiler. While recursion is not often required for many programming tasks, it is a very useful, time-saving function when the need for it arises.

Amiga Basic offers a variety of structured programming constructs to aid in logical program development. In addition to the standard FOR . . . NEXT loops, there are the IF . . . THEN . . . ELSE and IF . . . THEN . . . ELSE Block decision constructs. The last is especially powerful, as it allows multiline execution based on a program decision. Another important construct for logical decision making is the WHILE . . . WEND loop. If the statement or condition following the WHILE is evaluated as true, the statements between WHILE and WEND are executed before you continue with your program.

The compiler offers another structure, the SELECT CASE statement, which allows a programmer to create a highly-organized decision structure without using lengthy IF . . . THEN statements. There are two forms of the structure; one allows you to specify many ranges of data upon which to make a decision, while the other uses equality statements (=, < >, <=, >=, < and >).

Datafiles, I/O and Event Processing

Amiga Basic has a wide variety of commands for manipulating datafiles. Sequential files are the easiest to use, and there are many commands for creating, writing and reading sequential files. You can also specify the file buffer size, which can increase substantially the speed of file I/O. Random-access files are also heavily supported. These allow you to access any point in the file directly, without reading in the entire file to get the specific point you want. Seventeen different commands are available for use with random files.

A number of options exist in Amiga Basic for I/O communication with other devices besides the disk. In addition to it, there are SCRN: (monitor screen), KYBD: (keyboard), LPT1 (printer) and COM1: (the Amiga's serial device). The last allows you to set various parameters, such as parity, data bits, stop bits and baud rate (from 300 bps to 19,200 bps). These options make Amiga Basic well suited to many types of specialized communication needs, from standard modems to laboratory instruments that communicate via ASCII.

A powerful addition to any programming language is the ability to have the computer monitor various events without having to check them constantly yourself. Such event processing offers enormous flexibility to the programmer. Amiga Basic has several EVENT type commands. Once these are activated the computer will monitor automatically for the events you select; when a designated event occurs the program will branch to a routine specified in the ON EVENT command. Commands of this type include ON TIMER to force an event trap every *n* seconds, ON MOUSE to monitor mouse clicks, ON MENU for branching based on selected menu items, ON BREAK to monitor the break key sequence and ON COLLISION for use with the Amiga Basic animation routines.

Graphics: A More Muddled Picture

Graphics in general are well supported in Amiga Basic; a wide variety of standard commands are available, such as LINE, BOX, CIRCLE, screen GET and PUT, COLOR, PALETTE, PAINT, AREA, AREAFILL, PATTERN and PSET. You can define screens and windows in a number of different sizes and color resolutions. You may also create up to 10 menus, each with a maximum of 20 items, with the MENU statement.

Although Amiga Basic offers a large number of commands, it does not allow you access to every aspect of the Amiga's graphics capabilities, most notably in animation. While there are a substantial number of commands specific to the Amiga's animation system, the most advanced aspects of the extensive Amiga animation library (such as AnimComps) cannot be accessed ►

directly from Amiga Basic. In addition, to properly use the blitter objects you must use a cumbersome technique called *double-buffered animation*. This means you view one screen while drawing on another. If you do not employ double-buffered screens, you will experience varying degrees of flickering when moving objects.

Amiga Basic does, however, allow you to use many of the Amiga capabilities not built in to the language via the LIBRARY statement. You can attach up to five different libraries to your program at any one time. These libraries let you reach deep into the Amiga's operating system and use its features just as you would in a C, Modula 2 or assembly program.

Speed and Portability

The compiler offers a significant increase in speed over the interpreter (from three to fifty times faster, depending on the operation). Sometimes, however, even higher speeds are required. In such cases, both the interpreter and the compiler let you call 68000 machine-language routines that are stored in an Amiga Basic array and accessed with a CALL command, in much the same way as BASIC subprograms.

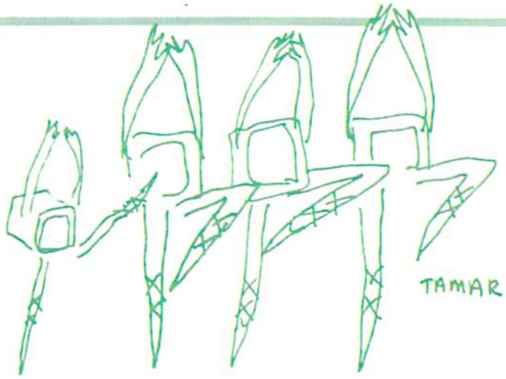
A final, and very important consideration in assessing the strengths of Amiga Basic as a development tool is the question of portability. In this respect, Amiga Basic proves itself an ideal language. If you do not use any machine-specific commands like animation, windows and screens, and speech, you can generally run the Amiga Basic program directly on the IBM PC, using QuickBasic, or on the Macintosh, using the Microsoft Basic compiler. Most of the standard graphics port directly to the PC, with only minor changes required for the SCREEN statement.

As a test, I compared a program on the Amiga to an identical one (except for one change defining a SCREEN) compiled with QuickBasic 3.0 on a PC clone running at 8 MHz (using a V20 and 8087-2 math co-processor) and equipped with an EGA monitor and an EGA graphics card (640 × 350, 16 colors). The program was a "real-world program," meaning it used many different types of computations and I/O. I found the Amiga was significantly faster in floating-point addition, subtraction, multiplication and division (even without a math co-processor); it was slower with trig functions, much faster in drawing lines and much slower in drawing circles. The Amiga was slower in printing text when the PC was writing in text mode, but about the same when the PC was printing text in graphics mode (which the Amiga is always doing). It was somewhat slower than the PC in integer math and in floppy disk I/O (reading and writing).

When comparing Amiga to IBM-PC portability, I found that programs written with the Amiga Basic/Absoft compiler system (using QuickBasic 3.0 on the PC) were quite a bit more portable than C programs with Lattice 3.1 (using the Microsoft 4.0 compiler on the PC). In addition, the overall speed in executing the programs compared favorably with the quickness you would expect on a fully-equipped turbo XT.

The comparisons also revealed the Absoft to be an excellent BASIC compiler. When run from the RAM disk, it is extremely fast, compiling hundreds of lines per minute. Code generation is also quite fast, compa- ►

SAM BASIC



AS THIS ARTICLE was going to press, we received a release copy of a new BASIC for the Amiga. Developed in England, SAM BASIC appears to be a powerful, full-featured Amiga-specific language. We will review it in a future issue, but we think it significant enough to mention briefly a few of SAM's vital statistics.

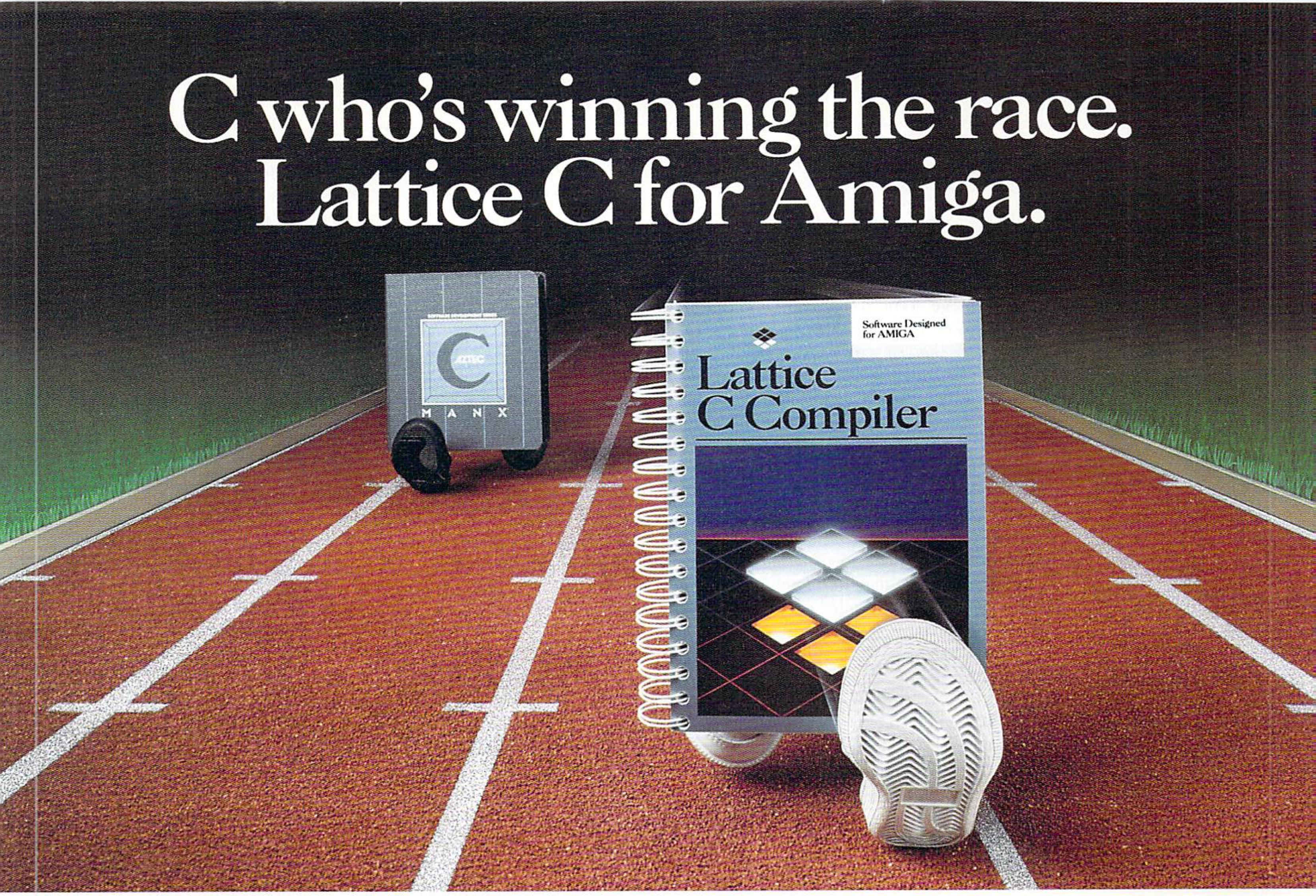
SAM BASIC is not a compiled language, but it is more than an interpreter. It optimizes the program when it is run, giving execution speeds about 50% faster than the Amiga Basic interpreter. It has, literally, hundreds of commands, many of which allow access to the lowest levels of the Amiga.

SAM is a multitasking BASIC, allowing up to 32 tasks at once (assuming memory exists to support them). It includes routines for animation (Sprites, VSprites and BOBs), shape tables and screen dumps. The drawing commands are quite extensive and include 3-D support.

There are several structured programming statements, but line numbers are required. Although SAM has its own built-in editor, you can assign your personal favorite by loading it with the ED command.

The supplied demos look quite impressive; some of them appear at first glance to be better than any I have seen in C. SAM BASIC has a run-time system that allows you to sell or distribute your programs. This package may help many BASIC programmers generate high-quality Amiga-specific applications.□

—LRW



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rable to the best BASIC compilers available on the PC market. As an additional plus, there are no royalties required for the run-time files.

True BASIC

CREATED BY John Kemeny and Thomas Kurtz of Dartmouth College, True BASIC developed both as the natural evolution of their original BASIC over the past 20 years and as the conscious redesign of the language to meet the needs of the more recent explosion in advanced microcomputer technology. It bears little resemblance to "street BASIC" (a term that loosely describes the many adaptations of early BASIC to the first generations of personal computers). It was created also in an effort to offer a truly portable language; True BASIC is available presently on the Amiga, IBM PC, Macintosh and Atari ST systems.

True BASIC is a compiled language, converting programs to a form of machine language. Although it offers an editor and compiler in one program and is as easy to use as most interpreted languages, True BASIC is not an interpreter. The built-in editor contains a variety of useful features, such as cut and paste, block delete, block move, and so forth, and it operates by either mouse or function keys. Help keys provide easy and generous assistance in every aspect of the editor's use. It uses line numbers only as an optional feature, but these can be used as labels for GOTO or GOSUB statements.

Features: Let's Have the "True" Story

True BASIC offers many features found in Amiga Basic and other advanced BASIC languages. It provides a number of structured control statements, such as IF. . . THEN. . . ELSE, DO. . . WHILE. . . LOOP and SELECT CASE (a more effective method of decision making than multiple IF. . . THEN statements). Two types of modular program blocks—functions and subroutines—supply valuable assistance in writing coherent, structured programs. Functions can be used by simply including their names in other areas of the program, while subroutines must be accessed by a formal CALL statement. Both can be internal or external (inside or outside the main body of the program). All variables can be either global or local, as needed.

Mathematical functions are well supported, exceeding the number found in Amiga Basic, and include the functions MAX and MIN as well as MAXNUM. In addition, True BASIC has a large number of functions dedicated to the manipulation of arrays. These MAT (matrix) functions allow you to read, write and print from the contents of entire arrays in a single statement. They enable you to perform elementary arithmetic operations on the arrays or to multiply them by scalar values. More importantly, however, you can use them to determine the identity matrix, the inverse, determinant, dot product, transposition and size of a matrix. The MAT functions are an invaluable aid in the development of advanced scientific applications.

Bitmap graphics in True BASIC are well designed, supporting the Amiga's many resolutions and colors. Unlike other languages, True BASIC allows you to assign the *logical resolution*, or range of points available on the screen. By assigning the screen mapping from within the program, True BASIC allows the same application to run on any graphics display, regardless of its actual pixel resolution—a significant consideration when porting a program from one computer to another. Points, lines, ellipses, areas and text are all supported and are fully portable.

Power Options: True's Special Libraries

While True BASIC has over 200 built-in commands, much of its real power lies in its ability to use special True BASIC libraries that extend its command set in specialized directions. For example, while True BASIC has several built-in string commands, you can add the Advanced String Library if your programming requirements call for sophisticated manipulation of alphanumeric strings. This particular library includes several dozen commands and can be used for formatting, pattern matching or evaluating strings; also, it contains a 37,000-word, compressed-format dictionary that can be used in your programs.

Another very valuable True BASIC specialized offering is the Sorting and Searching Library, which contains quicksort routines for manipulating strings or numbers. There are array search routines as well as pointer sorts, and it even enables you to perform multilevel sorts directly on your data.

The third library available currently from True BASIC is the 3-D Graphics Library. Three-dimensional representations of objects can be generated, using both perspective and parallel projections. You create the graphics using the X, Y and Z axis within a user-definable window. You may then change the "camera" view- ►

Company List

Absoft Amiga Basic Compiler
Absoft
2781 Bond St.
Auburn Hills, MI 48057
313/853-0050
$99.95

True BASIC
True BASIC Inc.
39 South Main St.
Hanover, NH 03755
603/643-3882 (service)
800/TRBASIC (sales)
$99.95

Also from True BASIC Inc.:
Advanced String Library
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point, altering the way the image appears in order to effect the 3-D transformation. Besides simple plot and line commands, there are functions for drawing in a single command entire arrays of points, lines and areas. Also, you can create cube, grid, circle and rectangle graphics primitives in 3D. More advanced routines allow for the plotting of some elementary 3-D contour surfaces with the removal of hidden lines. (Hidden line removal, however, is not supported in all graphics drawing commands.) Other advanced routines are available for scaling windows, manipulating camera angles, distance, view planes and up directions.

All three special libraries can be used with any of the four computers supporting True BASIC—Amiga, IBM PC, Macintosh and Atari ST. In addition, True BASIC Inc. offers a run-time system that allows you to distribute programs written or compiled in True BASIC. Inquiries should be made to the company regarding the commercial sale or distribution of programs.

"Truly" Portable

Program portability is an integral part of True BASIC's design. If you do not make use of any system-specific command sets, you may move quickly and easily programs written in True BASIC to other computers that support the language. Because it is a compiled language, True BASIC is also much faster than interpreted languages. In most cases, but not all, the Absoft compiler will generate faster code than True BASIC. In such areas as matrix functions, however, True BASIC is generally faster than user-written routines. You save, therefore, on development time, as the routines are already in place and do not need to be created by the application programmer.

A similar advantage exists in the use of the specialized library packages. Each offers powerful capabilities straight off the shelf for immediate use.

True BASIC also offers a Developer's Toolkit for those programmers who wish to develop software for the Amiga without worrying about program portability. This package supports animation, mouse and menus, screen dumps, hexadecimal functions, AmigaDOS, and various low-level and Amiga-system libraries. As with the True BASIC libraries, it contains dozens of routines ready to be linked to your program.

Conclusions

Our examination of both languages—Amiga Basic (with the Absoft compiler) and True BASIC—proves that BASIC in its more sophisticated forms is a genuine professional development language. Which is better may come down to individual needs and personal preference, as each has a variety of strengths. Compiled Amiga Basic programs execute faster than True BASIC programs. The large number of libraries and development aids available for True BASIC, however, make it the easier language in which to develop complex software. Each language scores high marks on portability to the IBM PC and Macintosh. Both languages are indeed valuable professional development systems.■

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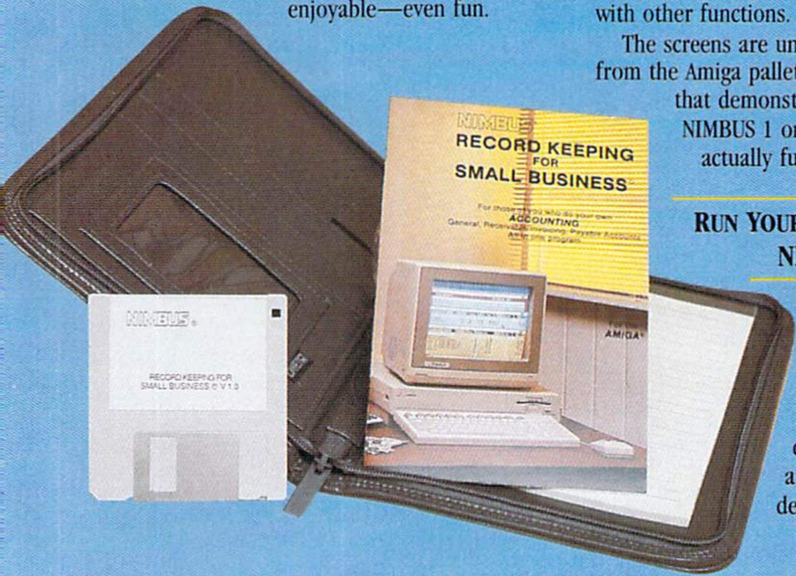
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"0400 Hours. Lookouts on the bridge. Target identification party reports one tanker, 6,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."



"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



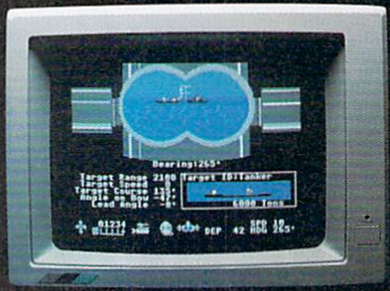
"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last tankers coming into 'scope view – an ideal target position. On my mark... Fire Tube 4! Fire 5!"



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Clear the "Bench"

Make your Workbench a winner

by clearing out the disk's "dead wood."

By Bill Catchings and Mark L. Van Name

A GOOD BASEBALL club with a bad bench never wins a pennant. The salaries of unproductive benchwarmers eat up the payroll that could have financed the rest of a winning team. The same is true for version 1.2 of your Amiga's Workbench. When the new version of the Amiga system software introduced many exciting new features and commands, there was a dramatic increase in the amount of space it consumed on the Workbench disk. (It now comes out of the package already 96% full, with 1665 of its 1758 512-byte blocks in use.) We can't promise you a World Series ring, but we can show you how to start making room on your "Bench" in order to capitalize on the added power and performance of your system.

If you have an Amiga with only one disk drive, or if you use the clipboard to hold fairly large data items, or even if you just want more free space than the less than 47K bytes now available to you, you need to start making some decisions about what you want, and don't want, to keep on your copy of Workbench. Many of the files it contains, such as demos, are clearly not important to your everyday use. There are, however, other, less obvious files that are also not necessary.

In this article we will examine the contents of the Workbench disk and point out many files that you can delete safely. We will use the standard Workbench 1.2 version 33.47 disk. Keep in mind that we will suggest the deletion only of files that we do not usually use. Some, such as all of the printer files that work with printers you do not own, are completely safe bets. Others, such as the Notepad program, may be ones that you use often, and in such cases simply ignore our suggestions.

While it is an obvious one, the usual warning applies doubly here: do this work only on a *copy* of your Workbench disk. We will be deleting many files, and you do not want to lose them irrevocably.

Start Pruning at the Root

We will discuss the disk's contents in a systematic fashion, starting with the root directory. In every directory we will look first at the files, in alphabetical order, and then at any sub-directories, again in alphabetical order. Because many of these files and directories do not have icons, they are not visible from the Workbench. You must, therefore, work in the CLI (Command Line Interface) in order to delete such files.

One of the first things you notice in the Workbench disk are many files named either .INFO or <SOME NAME>.Info. The latter represent the icons for the corresponding base files. For example, PREFERENCES.INFO is the icon for the Preferences program, while SYSTEM.INFO is the icon for the System directory. We will discuss the icon files for directories when we discuss the directories themselves. A special case is DISK.INFO in the root directory. This file is the icon for the entire Workbench disk. Files named simply .INFO occur in the root directory and other directories that themselves have icons. .INFO files contain information about the other icons in their directories. Anytime you delete a file you also should delete its icon; if you do not, it will appear that the deleted file still exists when you boot up the Workbench.

You should leave the .INFO and DISK.INFO files in the root directory of the Workbench disk. The root directory also contains two programs, Clock and Preferences, and their icon files, that are optional. In the sample Workbench we customized for this article, we kept Preferences and deleted the Clock. In addition to these files, there are thirteen directories, six of which have icons.

The first, C, has no icon but is one of the most important and largest Workbench subdirectories, containing the CLI command program files. There are 49 files here, and they consume 377 blocks. You can delete any of them that you use rarely or not at all, but you should be careful that you do not delete any that are used by other parts of the Workbench. For example, if you never write batch files, CLI commands such as IF and ENDIF look like good targets. Both of these are used, however, by the standard STARTUP-SEQUENCE file. We chose 11 likely targets here: DISKCHANGE (unless you have a 5¼" or other non-standard disk drive), ED, EDIT, FILENOTE, JOIN, PROMPT, PROTECT, RELABEL, SEARCH, SORT and WAIT. If you use one of the standard editors, ED or EDIT, keep it. In our sample we kept ED and deleted the other ten files.

The Demos directory can be scrapped because it contains nothing essential to everyday operation. You can delete it and everything in it.

The situation with the DEVS directory is almost the opposite: it is crucial to the operation of your Amiga. It contains six files ►

and three directories. Five of the six files are device drivers for Amiga functions: managing the clipboard (CLIPBOARD.DEVICE), synthesizing speech (NARRATOR.DEVICE), handling the parallel port (PARALLEL.DEVICE), working with printers (PRINTER.DEVICE), and handling the serial communications port (SERIAL.DEVICE). The sixth file, MOUNTLIST, is used to inform AmigaDOS of the characteristics of additional devices, such as a hard disk, that you have attached to your system. If you have made any changes with the Preferences tool, those changes will be saved in a seventh file, SYSTEM-CONFIGURATION, that is initially not present.

The three sub-directories in DEVS contain files that are used by various devices and CLI functions. The Clipboard directory is initially empty but is used by that tool for storage space. The KeyMaps directory contains 12 files of key mappings for different countries. You can delete all but the one you set with the SETMAP CLI command; we kept only the USA0 file. The third subdirectory, Printers, contains files that describe the command sequences obeyed by different printers. The Workbench disk ships with drivers for 16 different printers, but you probably work with only one of them and need to keep only the file that supports it. We kept the file IMAGEWRITERII on our sample disk.

The next directory in the root of the Workbench disk is named Empty, and that is exactly what it is. (Well, almost: it contains a .INFO file.) It is necessary because the Workbench environment does not offer a command equivalent to the CLI's MAKEDIR. To create a directory there, you first Duplicate the Empty drawer, which produces a new drawer named Copy of Empty. You then use the Rename function to give the new drawer a name of your choosing. This Empty directory is a keeper unless you never use the Workbench.

You should also keep the Expansion directory, even though initially it is empty. It is intended to hold the device drivers for hardware that you add to your system. For example, hard-disk manufacturers typically supply a device driver file that should be stored here.

If You Don't Want Every Font . . .

If you have played much with the Notepad tool, you have probably discovered that the Amiga can support many different fonts on its monitor. It gets these fonts from the Fonts directory, which contains seven files and seven directories. There is one directory and one file for each of the seven fonts (Diamond, Emerald, Garnet, Opal, Ruby, Sapphire and Topaz) that come with the system. Each directory contains one or more files that correspond to different font sizes. For example, the Ruby directory contains three files named 8, 12 and 15. You may delete any fonts you do not use. Because both of us are quite content with the standard font, Topaz, in our sample we deleted all of the files except TOPAZ.FONT and all of the directories, and their contents, except Topaz.

Next in our tour is the L directory, a relatively small but important one. It contains only three files: DISK-HANDLER, PORT-HANDLER and RAM-HANDLER. These files contain library functions used by AmigaDOS in the management of disks, the communication ports, and the RAM: disk, respectively. Leave everything here.

The LIBS directory is the home of system libraries that are used by application programs. There are seven libraries. DISKFONT.LIBRARY contains functions for the management of disk-based text fonts. ICON.LIBRARY and INFO.LIBRARY offer several Workbench functions. MATHIEEEDOUBBAS.LIBRARY and MATHTRANS.LIBRARY provide the single- and double-precision floating-point math functions, and the transcendental math functions, respectively. TRANSLATOR.LIBRARY offers the functions that perform text-to-speech conversion. Finally, VERSION.LIBRARY contains functions that allow programmers to specify and to verify the version of Amiga system software functions with which they are working. All of these libraries should remain.

The S directory is intended to be the standard repository for batch files. The EXECUTE command will check first your current directory and then the S directory when you try to run a batch file. It contains initially only one batch file, but it is a crucial one: STARTUP-SEQUENCE. This is the file that sets your initial path, tells you the Workbench version, and loads the Workbench as your system is coming up. Keep it and the S directory.

The System directory contains 15 files representing seven system utilities (one .INFO file plus two files per utility, the utility itself and its icon). We chose to keep three of these: CLI, Diskcopy and Format. We use all three occasionally from the Workbench. Do not be surprised, by the way, if you look in this directory and see not CLI.INFO but instead CLI.NOINFO. Until you turn on the CLI with the Preferences tool, its icon file is named CLI.NOINFO and thus it is invisible to the Workbench. Once you turn it on, the CLI's file is renamed CLI.INFO and can be accessed from the Workbench. We elected to delete the other four utilities: GraphicDump, IconEd, Say and SetMap. The biggest gain comes from deleting IconEd (34,460 bytes).

The next two directories essentially are empty but should be kept. The T directory is used by programs such as EDIT for temporary storage space. The Trashcan directory, which contains only a .INFO file, can be used for the deletion of files when you are in the Workbench. You drag a file's icon over the Trashcan icon and the file is "gone." Actually, it stays in this directory until either you use the Workbench Empty Trash function or the system needs the disk space. Until one of those events occurs, the deleted file can be recovered.

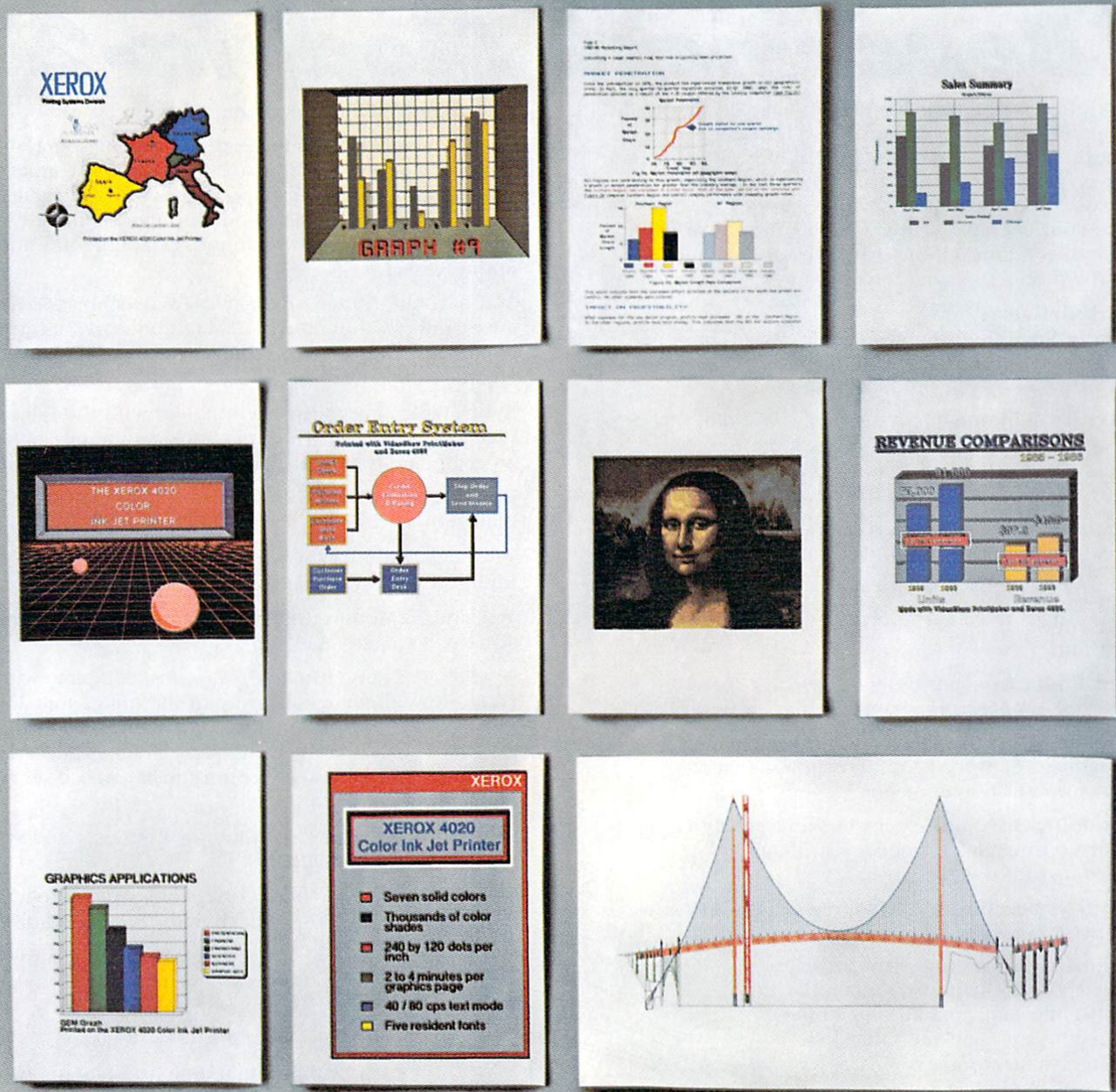
The final directory is Utilities. It contains a .INFO file along with two Workbench utilities, Notepad and Calculator, and their icons. We deleted both of these because we do not use either one regularly. Notepad, at 54,676 bytes, is the larger of the two and is the more profitable to delete.

"Bench" Strength . . . By the Numbers

If you make a few changes in Preferences (so that you have a SYSTEM-CONFIGURATION file in your DEVS directory as we do) and delete just what we did, you will reclaim about 440K of your Workbench disk. Our final numbers were 823 blocks used and 935 free, for a disk utilization of 46%. The whole process takes about 15 minutes, less if you are good with wildcards and the DELETE command.

You can reclaim about half of your disk with this customizing process, not a bad return on the time. You could, however, reclaim even more space if you are willing to work at it. For example, you could delete the Preferences tool, or CLI commands such as SETDATE or one of the LIST and DIR functions. Be careful, however, not to delete anything on which another part of the system depends, or you could find your new Workbench disk unable to serve you correctly. Yet, with a little effort and care, you can streamline your Workbench disk without losing anything you normally use, and you will be rewarded with a great deal more available disk space. ■

Bill Catchings and Mark Van Name are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Road, Durham, NC 27703.*



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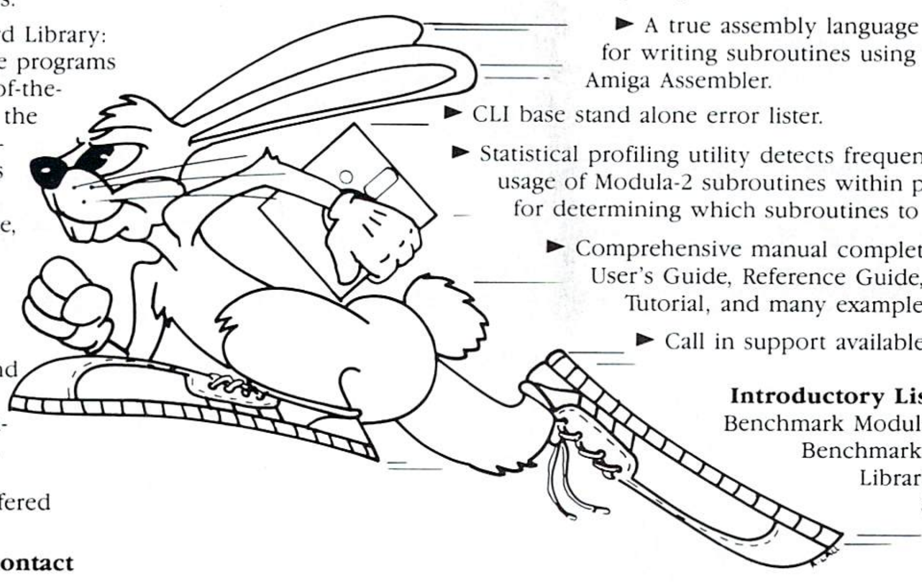
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THIS MONTH'S Digital Canvas is the work of Vinoy Laughner, former Senior Editor of *AmigaWorld,* who recently left us to pursue a degree in theology.

Vinoy brought his passion for art with him when he joined us at *AmigaWorld,* spending much of his time (but never to the neglect of his other duties) experimenting with DeluxePaint, Aegis Images and Digi-View. One of Vinoy's favorite pastimes (besides playing with the Icon Editor) is to digitize objects from almost any source (e.g., an oil painting, magazine photo, coffee cup, etc.) and paste them into collages. The results vary from the amusing to the intriguing.

So, Vinoy, these are for you. We hope things are going well in school, but if your enthusiasm for ancient Greek begins to wane, we could always use an extra hand around here.

Submissions to Digital Canvas should be on properly packaged disks and sent to:

AmigaWorld
80 Elm Street
Peterborough, NH 03458
Attn.: *Roger Goode*

Please include brief biographical information and relevant information about how the images were produced. Please submit disks with no fewer than ten pictures. A slide show format will be appreciated.








Amore!



Searching the Heavens

Astronomers at Palomar Observatory and the California Institute of Technology are using the Amiga to aid in studying objects at the edge of the universe.

By Peggy Herrington



The Great Galaxy of Andromeda (M31) as displayed by CCDAMIGA software.

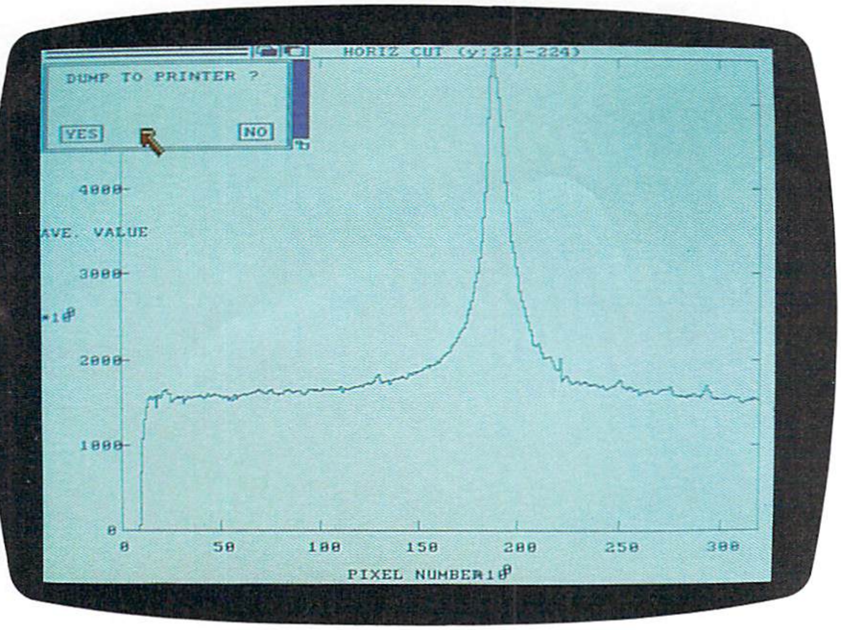
Scientists in sunny southern California are using an Amiga in one of the oldest and, to many of us, most fascinating fields of human endeavor: the exploration of the universe. They are using the Amiga in a number of ways to enhance their study of quasars—those exploding cores of distant galaxies that radiate enormous quantities of radiation and are thought to be the farthest, and therefore oldest, objects in the universe. I discussed their latest technological discoveries with scientists at Palomar Observatory and the California Institute of Technology.

"The Amiga is a scientific instrument that provides us with access to processing power greater than that available from any other microcomputer in its class," says Fred Harris, Caltech electronics engineer and member of the Palomar research team. Fred was responsible for bringing the Amiga into the picture at Palomar. "It provides fast display and data capture from direct imaging devices and, among other things, lets us record, view and analyze images immediately." Harris, who holds Amiga developer status, designed and built the Zorro expansion interface used to connect the Amiga to the Observatory's telescopes: their 5-meter wide Hale, which is referred to casually as the 200-inch, and a smaller one-inch telescope.

Caltech programmer Christopher Oke wrote custom software to separately record the data for each picture and control the camera's shutter, which usually must remain open for about an hour. Rather than using photographic plates, however, images like those pictured here are made with charged coupled devices (CCDs), an array of light-sensitive picture elements ("pixels") on a

silicon chip. Each 16-bit pixel becomes charged in proportion to the amount of light striking it, and since most of the Palomar CCDs contain 640,000 pixels (800 × 800), a complete picture uses more than one million bits. This requires two megabytes of expansion RAM on the Amiga. According to Harris, CCDs have replaced photographic technology because they are 100 times more sensitive to light, especially that of the longer wavelengths like red and near infrared spectra.

Once a CCD exposure is made and its data stored in the Amiga's memory, it is transferred to a buffer in preparation for display on the monitor, several of which can be situated around the telescope so that the astronomers can see what the telescope is tracking. At this point, the data is converted into 31 different Amiga colors in a bitmap five planes deep, and because of the size of an image, only a portion of it can be displayed on the screen at any given time. Sometimes these pictures are converted into false color images that can be strikingly beautiful.



Graphic analysis of horizontal cut through the Andromeda galaxy. The y-axis represents light intensity. Analysis performed by the CCDAMIGA software.

But they're "business-as-usual" to the scientists. "Most of the time we don't even save the images," says programmer Oke. The information they represent is reduced mathematically and retained in a more compact form. "It's just a capability I put into the system because it was easy to do and a way of saving things if we needed to, but it's somewhat limited as to the size of an image you can fit onto a 3½-inch disk, which is about one 800 by 800 image," Oke explains. He and Harris believe that the availability of a hard-disk drive (several of which are just becoming available as we write this) will bring the Amiga into the select class of *genuine* scientific computers, and they have plans to add such a device to their system as soon as possible.

Pointing to the Amiga's flexibility and power, Harris explains that its foremost use to his team is as a laboratory testing device that assists in the operation and calibration of CCDs prior to their delivery to the Observatory. It is used as a semi-portable data system for observing with CCDs at Palomar, and for the calibration of CCD cameras, using the star Vega as the standard. "Toward this end," he remarked, "we have calibrated our best-known CCD and have now brought it back with the Amiga to campus."

Besides being used as part of the viewing system for their probe into the universe, and as a laboratory testing device, the Amiga is also used as a controller for the guiding system for Palomar's 200-inch telescope. Oke's software provides the working astronomer with the x and y coordinates to reposition the telescope as objects move across the sky (or, more accurately, as the earth rotates) so that he can adjust the path of the telescope and track the object being recorded.

We asked what the stars predicted in the future for the Amiga at Palomar Observatory and Caltech. "We would like to see it tied into the 200-inch telescope control system," Harris replied, smiling at our reference to astrology, but declining to take the bait. "That way, we could not only use the arithmetic capabilities of the processor, we could have it make correction calculations and guide the telescope automatically, without the need for human intervention." Whether that's done or not depends on the Observatory's pulse-control system. "At present, that system will accept pulse input to drive the telescope around," Harris explained, "but we haven't developed the hardware for the Amiga to make it pulse output." Since there are plans to allow an RS-232 serial port in the control system in the near future, Harris isn't sure whether they will develop the hardware for the pulse output or use this serial port input, which would require further Amiga programming.

The Palomar Observatory Amiga system includes a 512K A1000 with external 3½-inch disk drive, color monitor and Comspec 2-megabyte RAM expansion board. On order is an 8-Megabyte RAM expansion board; they're shopping for a hard-disk drive with controller. Harris is now developing an interface that will connect the Amiga to Caltech's DEC Microvax II and their VAX 780 computer, both of which are used to process the large number of CCD images obtained at Palomar every night. He feels that the Amiga can enhance data collection and processing for smaller observatories and is hopeful that this will broaden its applications. He offers the design of these connections and that of the Zorro interface along with the custom software he and Oke developed (which is written in Lattice C and includes a number of assembly-code routines to increase operating speed) to other professional astronomers in the interest of advancing use of the Amiga in the exploration of the heavens. For more information, you can contact Harris at Palomar Observatory. ■

Peggy Herrington writes for AmigaWorld *and other publications on a wide range of microcomputer topics, specializing in music and telecommunications. Write to her at 1032 Forrester St. NW, Albuquerque, NM 87102.*

Publisher 1000

Getting your name in print has never been easier.

By Gary Ludwick

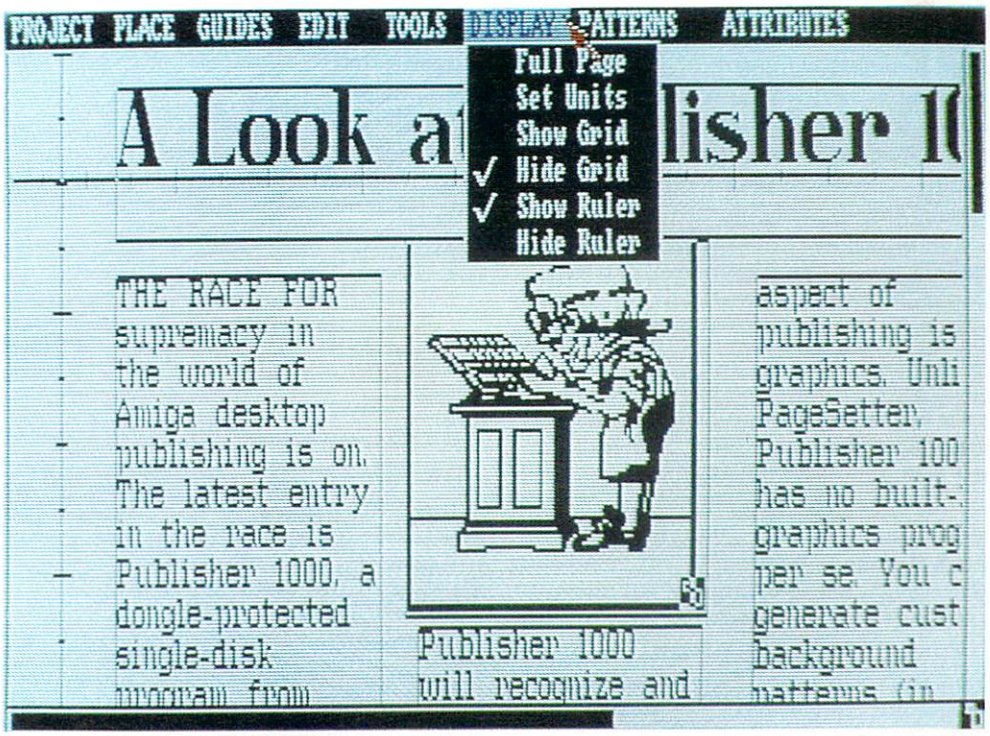
THE RACE FOR supremacy in the world of Amiga desktop publishing is on. The latest entry in the race is Publisher 1000, a dongle-protected single-disk program from Northeastern Software Group and Brown-Wagh Publishing. As any desktop publishing program should, Publisher 1000 provides a What-You-See-Is-What-You-Get (WYSIWYG) screen display. All of the program's tools and controls are accessed through pull-down menus—unlike PageSetter from Gold Disk (reviewed in May/June 1987), which uses an on-screen icon display.

Publishing begins with the written word, and Publisher 1000 gives you two ways to generate copy: the built-in text editor or an external word processor. Publisher 1000 will recognize and load all standard ASCII files from programs such as Scribble, Textcraft or Notepad. If you use a second-generation word processor with an IFF text formatting system (ProWrite or VizaWrite), you'll have to wait for the promised upgrade, which also will include Postscript support. Publisher 1000's internal text editor is less than great. I found it difficult and confusing when generating long pieces of copy, and resorted to only writing headlines and captions with it. In my opinion, that is as it should be. Publisher 1000 is not supposed to be a word processor, and anyone serious about writing or publishing should have a full-featured word processor at hand anyway.

The second major aspect of publishing is graphics. Unlike PageSetter, Publisher 1000 has no built-in graphics program, per se. You can generate custom background patterns (in addition to the wide selection provided), but it depends totally on programs such as Electronic Arts' DeluxePaint or Aegis Images for graphics to be used on the page. Publisher 1000 does a surprisingly good job of translating 32-color graphics into shades of black and white, although it often needs more than 512K to complete the job. Once graphics have been pasted down on the page, you can both crop and resize them. The combination of tools is invaluable.

So far all desktop publishing programs use the same page layout philosophy. You create a series of boxes on the page into which you place text and graphics. How you create those boxes differs from program to program. In Publisher, you specify the number of columns, the spacing between columns and your page's top, side and bottom margins. Publisher creates your page template almost instantly, but there's still a lot to do. Basic page layout does not take into account things like headlines, pictures and captions—not to mention rules (lines between columns) borders and screens (a light tone used under text to highlight it). Publisher 1000 has a number of tools that make these tasks a lot easier.

Because Publisher 1000 is a WYSIWYG program, and because your screen is horizontal, you only see about ⅛th of a page at a time. But the vertical and horizontal scroll bars make getting around the page relatively easy. In addition, any time you are changing the size of a box, text or graphic, Publisher 1000 goes into an automatic ►



A sample page from Publisher 1000.

scroll mode. As your cursor moves past the current screen border, the screen automatically scrolls into the next ⅛th screen section. By clicking a pull-down menu, you can put a representation of the full page on your screen. It's small, and you can't read anything, but it will give you a reasonable idea of how your page looks overall.

For quick page rearranging, all the boxes you create come with sizing gadgets. Moving boxes around and resizing existing boxes is made easier by Publisher's constant on-screen display of X and Y coordinates. Publisher 1000 also provides a constant on-screen rule (in picas or inches) to further assure alignment and proportion.

Once the blank page has been layed out, it's time to paste down your text and graphics. In Publisher this is a pretty simple operation. Using a pull-down menu, you load your text file. Publisher 1000 will then ask where you want it placed; click the cursor in the box where you want your text to start. If you have more text than one column can hold, simply choose Continue from the menu. Publisher will ask where to continue from and to. Click in the appropriate columns as many times as necessary. The program will link all of the designated columns together and flow the text from one to the next.

Font of a Different Type

Another very strong attribute of Publisher 1000 is its wide variety of type faces and sizes. Besides including the stock Amiga faces, a new series of faces was designed for clarity and readibility on dot matrix printouts. These faces come much closer to the quality of fonts used in professional publications and are a big improvement.

You can choose your text font before flowing it onto the page, or you can wait and do it afterward. By choosing the latter course you can—by changing the type size, font and the leading (the amount of white space between lines)—extend or condense your text in order to properly fill the space available. After making such changes from the menus and choosing Reflow Text, all text in linked columns will be altered. If you want text in white letters on a black field, clicking Solid on the Tools menu and redrawing a new box over the old one will reverse everything within the box.

Printouts on my Epson RX-80 were excellent. You really have to see the quality that bit graphics can achieve to appreciate the difference. Solid black areas would occasionally exhibit some mottling and tiny white lines, but the reproduction of the typefaces was superb.

Publisher 1000 is a first class effort at desktop publishing on the Amiga. The manual is superb both in quality and in the clarity of presentation. But the program isn't perfect. The pull-down menu interface is just not as quick, convenient or easy to use as PageSetter's on-screen icon method. But Publisher does have some features PageSetter lacks. I urge you to try out both programs before deciding.

A couple of other minor points: The automatic screen scrolling is touchy. Because the scrolling doesn't occur until the pointer is off the screen, the mouse can get way ahead of where you want it to be. The automatic scrolling action will then far overshoot the desired screen position. Not a big thing, but often very annoying. I occasionally had difficulty getting Publisher 1000's decorative borders to print out correctly on screen. Lastly, the program could also use an intermediate magnification mode that falls somewhere between the ⅛th page and full page views.

But for those looking for a reasonable balance between features and price, who don't need all the professional features offered by a program such as PageMaker on the Macintosh, or who don't plan on being full-time desktop publishers, Publisher 1000 certainly provides very good value for the money.

Publisher 1000
Brown-Wagh Publishing
16795 Lark Ave., Suite 210
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800/451-0900 (in California 408/395-3838)
$199.95
512K required.

Easyl

To cure an artist's headache: Take one tablet, and draw me in the morning.

By Gary Ludwick

EASYL IS really two products for the price of one—a sophisticated electronic graphics tablet and its companion paint program. Rather than monopolizing the parallel port, Anakin Research designed the Easyl tablet to tie into the expansion bus on the right side of the Amiga and provide pass-through. The pad is coupled to the electronics box by a two-foot cord, which is ample if you lay the tablet directly in front of the 1000's main chassis. But, be sure you have plently of space; Easyl's electronically-active working surface is 8½ × 12 inches. The command strip adds an inch horizontally, while the laminate and wood border adds two inches all around.

A pressure-sensitive tablet, Easyl's smooth, yet pliable working surface covers a 1,024 × 1,024-point electronic grid. The tablet's resolution outshines that of both the Amiga's monitor and currently available drawing programs. The tablet's electronic interface translates this high resolution down to the Amiga's lesser resolutions.

Easyl allows you to work with the tools you are most comfortable with: pen, pencil or stylus and paper. You can use any drawing instrument on the tablet, as long as it is firm enough to create some pressure. Rather than drawing directly on the pad itself, you use ordinary drawing paper anchored with double-sided tape.

Drivers, Start Your Tablets

While designing the tablet, Anakin Research realized that both right- and left-handed people exist, an obvious but often overlooked fact. On the tablet's border are two membrane-type switches—a red dot corresponding to the left mouse button and a white one corresponding to the right. With this system you can keep one index finger on the buttons, while the other hand draws. The dilemma is: which hand? If you just switched the tablet around, you'd be drawing upside down and backwards. Easyl's software drivers eliminate the problem.

Easyl has six different software drivers, three each for right- and left-handers. All are provided in both PAL and NTSC formats. The regular drivers allow you to position the tablet with the control buttons on the left or right. And, just as when drawing with the mouse, you must keep the red button depressed for any action to register on the screen. If holding the button gets tedious, the second set of drivers reverses the use of the red button only. Now the only time you must hold it down is when you want to determine a corresponding screen location for a point on your drawing paper without leaving any mark on the screen. Normally, the full pad surface is mapped onto the full Amiga screen. The Pro drivers allow the full pad surface to be mapped ►

onto a window you size yourself. Depending on how you scale your window, you can create intentional distortion or smaller true proportional work.

One of the joys of using Easyl is that you can use it for things other than paint programs. Almost any program that uses an icon interface is a candidate for use with the tablet, in part thanks to a set of self-sticking registration pegs. By putting these pegs on the border of your tablet, and then hole punching your drawing paper, each sheet you put down is in exact registration with the previous sheet of paper. Animation becomes 100 times easier.

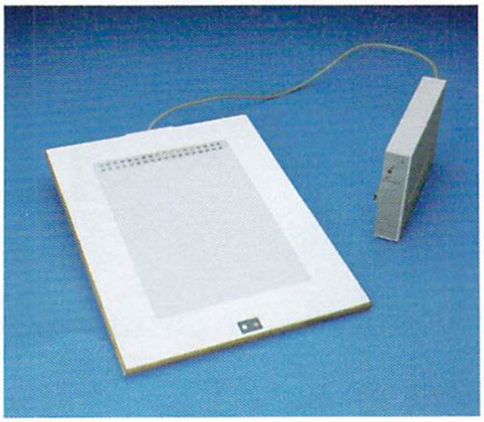
With these versatile pegs, and the registration they provide, you also can create command templates for programs that use on-screen icon controls and requesters. Now, instead of sliding a mouse all around the table top, you can simply point and touch to control a program such as DeluxePaint II, DeluxeVideo, PageSetter and Superbase.

From DPaint to EPaint

One piece of software designed specifically for touch input is the Easyl Paint Program that accompanies the tablet. Yet another paint program may seem superfluous, but not when you consider the tablet's coordinate capture rate of 250 coordinate pairs per second. The Amiga's mouse isn't up to that kind of speed, and the Easyl tablet must electronically cripple itself somewhat when working with mouse-controlled paint programs. Artists benefit from this higher capture rate, which yields higher resolution and finer line control. Easyl Paint also offers menu selection of four different resolutions. However, you pay the price for coupling a high capture rate with high screen resolution; the screen display lags behind your pen's actual tablet position.

The two rows of tiny, membrane-type colored switches aligned down the tablet's side represent the palette available under Easyl Paint. Besides the 16 actual colors and 16 shades of gray scale, there are pads for other controls such as Fill, Clear Screen, Keep (save to back screen) and Restore (return to front screen). As nice as DeluxePaint is, a little time spent with these features will really spoil you for using a mouse. In Easyl Paint, the mouse is relegated to pull-down menu items—brush selection, resolution and other on/off features of the program.

Easyl Paint contains many of the kinds of features you've gotten used to in other paint programs and a few new tricks. For instance, the Infill command makes sure that adjacent sampled points from the pad will always be joined. Thus, any stroke you make will be completely filled with no gaps (unless you didn't press down hard enough). The real reason for Infill (a default on) is to help very fast artists from exceeding the pad's sampling rate and getting gaps in their lines as a penalty. The Thinning toggle command is the reverse of Infill. Due to the high sampling rate of the pad, a slowly drawn stroke, or one made with a blunt instrument, may appear too thick due to pixel clustering. Thinning prevents this, if desired.



The Easyl drawing tablet and interface box.

Easyl Paint even offers you a choice of screen/tablet formats, as well. Portrait, for a vertically oriented pad, compresses your picture on screen display, but still lets you use the full height of the pad for drawing. Borders to eliminate the left and right unused portions of the screen can be toggled on or off. Landscape mode is the initial default that corresponds to the Amiga's horizontal screen display.

In ten words or less, Easyl is a first class piece of work. Anakin Research has very obviously put a great deal of time, thought, effort and artistic input into this product. The manual does a good job of telling you everything you need to know. The software works flawlessly; the tablet is superbly finished.

If your interest in Easyl is artistic, you might want to test drive a unit before you buy, since every artist has his own style of working. If your interest runs more to developing touch input systems for software you already have, or if disability prevents you from making full use of your Amiga, get Easyl tommorrow. And if you are a software developer, or have an application in mind, Anakin will provide driver source code to make interfacing with Easyl, well. . .easy. At $499, Easyl is not cheap. But, in the right hands, it is worth every penny.

Easyl
Anakin Research
100 Westmore Dr., Unit 11C
Rexdale, Ontario, Canada, M9V 5C3
416/744-4246
$499
512K required.

Imprint and the Polaroid Palette

Just aim and shoot. Capturing Amiga art was never so easy.

By Roger Goode

GETTING GOOD hardcopy is a major dilemma for Amiga artists. Color printouts just don't compare to the original screens, no matter how good the printer is. If you can tolerate the resulting distortions, you can take screen shots in a darkened room. You could send your disks off to a slide-making company. But if you want to do it yourself with consistently good results, you should consider the Imprint system and Polaroid Palette Film Recorder.

The Polaroid Palette is a piece of hardware about the size and shape of a large shoebox, with a space on the front for a Polaroid or 35mm camera back. Very simply, inside there's a small black-and-white TV screen and a set of color filters. Liquid Light provides a hardware interface between the Amiga and the Palette and the driving Imprint software. The system makes high-quality, undistorted slides, prints and instant Polaroid pictures of almost any screen you want to capture on film. It will also produce a set of four-color separated 35mm slides from a single image, for making silk-screens and plates for printing.

Auto-focus

I'm not a particularly technical person, and I'm pleased to say that Liquid Light passed the fumble-fingers test. The manual is brief (less than 30 pages), to the point and easy to follow. Setup and operation are simple.

After hooking up the Palette, you must make some simple adjustments to be certain that the image inside the Palette box is sharp and clear. As in all the program's ►

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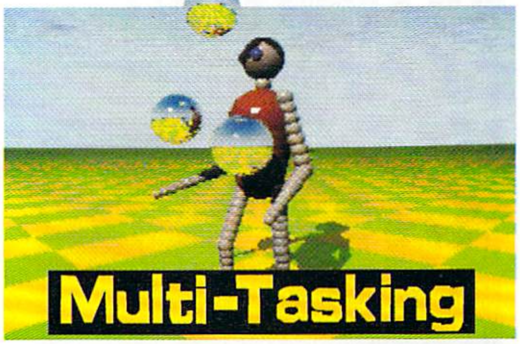
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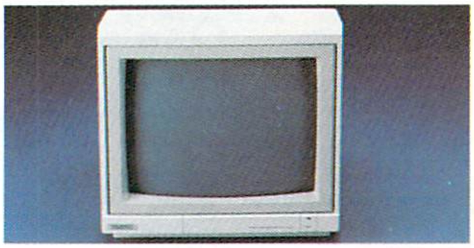
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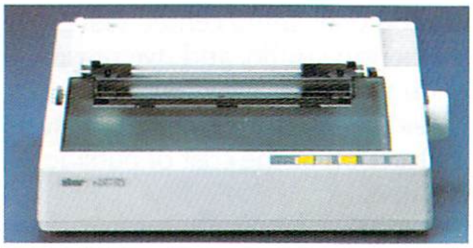


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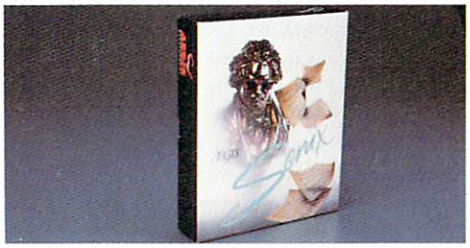
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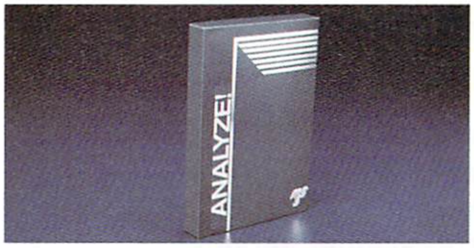


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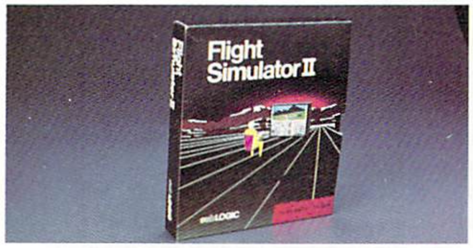
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functions, the built-in utility has on-screen instructions to walk you through the procedure. Select your film from the list of accepted types in the pull-down menu, and the program handles the rest. The whole program takes full advantage of the Amiga's intuitive control, making it very easy to deal with. Once your adjustments are complete, you're ready to start making hardcopy.

You'll first want to take pictures of the test pattern provided on the Special menu. Also on this menu is the Edit Exposure option, which lets you change the red, green and blue value for each exposure. To adjust a picture's brightness, you can also change the white value. When an exposure is made of the test pattern, the numeric value given to each color is recorded in the print, along with a basic color pattern for a visual check. By making a series of test exposures, each at a different setting, you can easily determine which combination best suits your needs. Once you've established your preferences in film type and exposure settings, they can be saved to disk as defaults. You can easily change the settings again for individual exposures, but using your defaults really saves time.

Okay, the camera's loaded, the Palette's on, the proper adjustments have been made—*now* can we make some photos? This is probably the easiest and most fun part. Any IFF compatible picture in any resolution, except Hold-and-Modify mode, can be loaded and viewed (from either drive). To



DeluxePaint artwork captured by Imprint.

shoot, all you do is go to the Expose option under the Projects menu and select Single. While the exposure is being made and each color filter is moved in place inside the Palette, your picture is broken down pixel-by-pixel on screen in a timed display of black-and-white patterns. If it doesn't sound like a spankin' good time to watch, then I suppose it's one of those things you have to see. When the exposure is finished (about one minute), a screen message instructs you to proceed.

Imprint has its own color editor in the Special menu that allows you to make adjustments to your picture as you would with a paint program. This saves you from having to exit Imprint and boot up another program in order to make any last minute changes. Another nice option in Special is the Raster Fill mode. Raster Fill works with lo-res pictures to eliminate the horizontal raster lines from the images. Imprint makes one exposure, then shifts the image down by a half pixel and makes a second exposure on top of the first. Raster Fill works so well that I won't shoot a lo-res picture without it. If you have a motorized camera back to advance the film, you can take advantage of two other options, C-M-Y (cyan, magenta, yellow) for making color seperated slides and BATCH, for making up batch files of pictures.

As a bonus, there is a separate program on the Imprint disk called Snapshot. Snapshot is a RAM-resident utility for making ►

screen-dumps to the Polaroid Palette. With one keystroke you can make a slide or photograph of almost any screen, from any program, while it's running.

Who Needs It?

The system may be easy and fun, but how well does it work? In my opinion, the results are excellent. I ran a number of tests with both Polaroid instant print film and with slides, using original artwork of varied nature and digitized pictures. The color reproduction in the slides was amazingly close, but the Polaroid film didn't fare quite as well. The images are all sharp and clear and fill most of the picture frame with only the slightest curvature at the edges. Best of all, the quality of the pictures is consistent for each shot and roll of film (assuming everything is set properly). No more bracketing every shot with extra exposures at different F-stops to insure one good shot.

The only real drawback is the rather high price-tag. As a professional tool it's not over-priced at all, but it's not something that the average Amiga owner is going to be able to run out and buy. But for the User Group that is really serious about their graphics, it would be well worth pooling their resources for. Or perhaps you're an enterprising individual who could defray the cost of the Palette and Imprint by selling a slide-making service to others. An investment like this would be worthwhile for businesses and professional artists.

All in all, Imprint turns over a lot of control to the user, while remaining simple enough for even the least technical among us. The program designers deserve a lot of credit for keeping the user in mind. Making a product that will serve a specific need is one thing, but making one that serves the users, regardless of their technical background, calls for a round of applause.

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575 Technology Square—9P
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617/577-3796
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Acquisition

Once restricted to mainframes, relational databases are making their mark on the Amiga.

By Al Willen

ACQUISITION, from Taurus-Impex of England and distributed by Haitex Resources, should have been a great product. According to the specs, this relational database can have fields as large as 10MB, contain a maximum of 10 million fields per record, yield 100 million records per file, have a one-gigabyte file size, allow up to 16 relational sort paths per file, support full Amiga graphics, provide access to at least four different file formats and provide reporting on both an automatic or manual user interface.

It should have been great, but it isn't. After examining it carefully, I don't like using Acquisition at all. Though technologically superior, Acquisition is disjointed and confusing to work with.

Promises and Delivery

Acquisition lets you manipulate field variables, enter data into these field variables, store the desired data in an organized fashion and retrieve and display stored data based upon criteria you design. Unlike many entry-level database management systems, Acquisition supports up to 16 additional relational paths per file, an automated screen interface and a programming environment using the Acom language.

To have a feasible relational system you must have enough processing and storage power available within the host environment, and you must have a multiuser network simultaneously accessing the multifile system. One reason Acquisition fails is that it places a premium on the relational concept, yet completely ignores the system it is running on. The Amiga is a powerful microcomputer, but it is limited by RAM and disk size, and it will never be an out-of-the-box multiuser machine. Even a souped-up Amiga with 8MB RAM and a 60MB hard drive would never fulfill the potential of this software.

Besides relational data structures, Acquisition also stresses a user-interface language called Acom, an interesting combination of BASIC and C that is compatible to dBase-III's programming language, Prism and Paradox's PAL language. Acom is a more powerful route of accessing data from previously established Acquisition databases. With it, you can create modifying streams, macros or large retrieval programs. A stream is a very small program file (less than 256 bytes) that is attached to any field, and is activated when that particular field is accessed. Macros and larger Acom programs are composed of reserve words that serve as structure commands, mathematical and Boolean data manipulators or special Amiga machine-specific commands. If you don't like Acom, you can access the database with the automatic reporting interface or your own BASIC or C program.

Less Than the Sum of the Parts

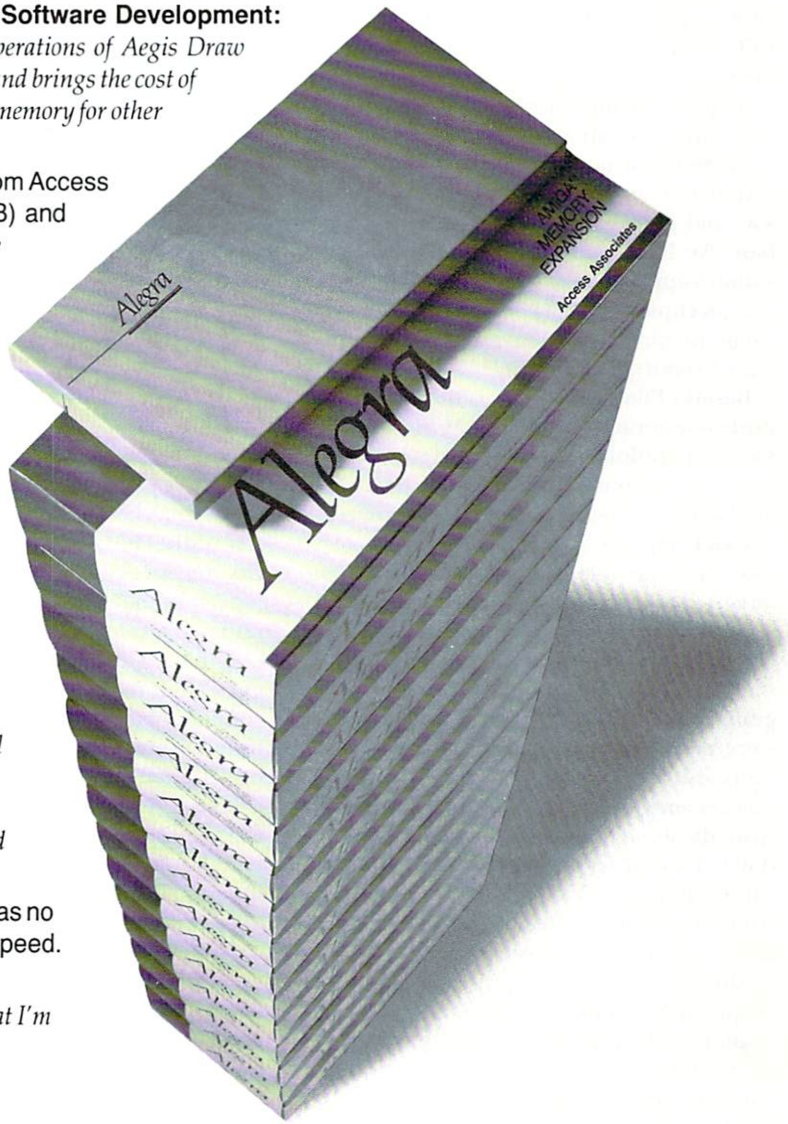
Acquisition is a combination of programs stored on two system disks, Make and File. The Make disk contains a utilities drawer, creating, pasting and bridging editor programs. The File disk contains another utilities drawer, settings, filing, linking and reporting programs. With two system disks *and* a data disk, disk swapping is wonderfully complex.

You can access the Make disk's programs from Workbench. The Utilities drawer contains a disk format routine, a requester assignment program and CLI access from Workbench, though neither system disk contains a c directory of CLI commands. Creating generates the fields, their names, field streams (Acom auto-exec files), storage types and length of the file. Pasting allows access via windows to up to 16 different database files. With it, you can create and alter the screen presentation of the project. Bridging creates the pathways between two or more data files via like fields. System and relational paths are supported. Besides the paths to and from different files, Bridging also orders access.

On the File disk, Settings creates default system settings. The Utilities file contains a last minute text file, new disk file, assign file and CLI access. Filing is for entering raw data, data editing and simple one-file reporting. Linking designs a report via a text file. Linking also establishes a tracing routine which determines, via user criteria, which parts of the filing system are used in the report. A subroutine of Linking, Reporting displays a previously defined report.

Acquisition isn't terribly difficult to learn. What makes it horrible to use is a feeling of lack of organization. Each processing stage of Acquisition (file creation, file reporting) ►

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is handled by a specialized corresponding program. Some programs, such as Pasting, are extremely well done with pull-down menus, mouse menu bars and keyboard alternates. Others are shoddy and present an air of confusion. Interrelated programs (such as Settings and Creating) are often on different disks, making more work than necessary. The lack of a help option also contributes to Acquisition's shortcomings.

Each section of the 300-page manual describes one of the specific programs comprising Acquisition. However, the book is riddled with misspellings, and some Acom command examples don't always work as shown. To make things more confusing, chapters are not presented in logical order. The manual should provide examples of creating a simple unifile, like a phone directory, before plunging into complex, multifile relational file structures in Chapter One.

Acquisition supports four different file structures, including IFF and a custom or variable file structure, so you can load and save data from IFF-compatible word processors and graphics packages into your database. An IFF picture can be registered within your database so that although it only occupies the space of one picture, that single picture can be accessed by any number of reports.

Besides File Fields, Acquisition also supports temporary Memory RAM Fields to speed operations and to perform rapid one-time calculations. Several months ago I created a 48-field-per-report file structure on another popular database; the program took over one minute to append this rather large report. Acquisition appended this same file in less than one second. Since each mode is a separate program rather than part of a large, memory-resident program, the unused RAM can temporarily store more of your data file. Thus calculations and file restructuring are done on a quicker memory level than on a disk level. Also, database housekeeping chores are done at specified times according to Acquisition's needs (or yours), so time is saved from needlessly performing these important, but often unnecessary, tasks.

Similar attention to detail can be seen in Acquisition's graphics and extras. The program has great background screens and superior use of icons throughout the system. The wait pointer (an animated English Bobby) is truly amazing to watch. You can even place background graphics behind and around field entry boxes. Thus, a realistic personal check can serve as a backdrop for entering check data. One of the many options that lend a professional touch is the comprehensive decimal/hex calculator, which can be activated from several programs by clicking on its icon.

As a whole, Acquisition has some serious organizational faults. The manual should be proofread and completely rewritten, building from the simple to more complex in small logical steps. The main problem I had with Acquisition was its lack of consistency, and an overall feeling that the product was a hodgepodge of brilliant, but ill fitting, sub components. I wanted to like the program. But only with comprehensive reworking will Acquisition live up to its potential.

Acquisition
Haitex Resources
208 Carrollton Park, Suite 1207
Carrollton, TX 75006
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512K required.

Diga!

Though good for your modem, this program may wreck havoc with your phone bill.

By Peggy Herrington

AN AMBITIOUS undertaking even in its first release, Diga! (which loosely means "speak to me" in Spanish) may not be the ultimate telecommunications package, but one thing is for certain: It's a gutsy program both in scope and implementation.

Aegis wasn't content to rest on established protocols and screen displays (optional interlace mode with true overscan using special fonts in up to 132 columns with 50 lines) for communicating with mainframes, mini and microcomputers using a variety of occasionally imperfect terminal emulations (VT100, VT52, Tektronix 4010, ANSI, TTY and TALK, which makes everything audible). Rather, Aegis equipped Diga! with a new protocol dubbed DoubleTalk and an option for customized emulations. DoubleTalk makes real-time two-way conversation via keyboard entry (called chat or conference) possible between two Amigas, at the same time that files are transferred—a time-saving boon. Because Aegis recently put the code for DoubleTalk, and instructions for tailoring emulations, on CompuServe and BIX, developers are incorporating them in emulations for specific situations, like bulletins boards using DoubleTalk and an American PeopleLink module with WXmodem protocol (scheduled to be on Delphi) and a split screen window for conferencing.

Reach Out and Interface

The number of protocols incorporated in Diga! is indicative of its force. Xmodem and Ymodem both in standard and CRC, CompuServe "B", Kermit (with server mode) and ASCII are present in binary or text format. The program supports up to 31,250 baud and I've successfully used all except Kermit at 1,200. These protocols are available in Remote mode, too, which prompts Diga! to answer incoming calls with any auto-answer modem (you change parameters on the Modem Set Up screen rather than flipping dip switches) and permits system access to specified areas with password security. Multiple file transfers in both calling and remote modes are possible provided the protocol in use permits them.

Innovation, emulations, protocols, remote operation and multiple file transfers are important features, but Diga!'s attention to detail and ease of operation is what makes the difference. You can scroll back and forth in the capture buffer view window, for example, resizing and leaving it onscreen without interfering with the flow of incoming or outgoing data. Although you set the buffer's size as you open it (4K to 512K) and save the contents to disk when it's full, it also has an optional Loop mode that will delete the oldest information as new information comes in. The Help key pops up a Fast Menu that lets you alter communication parameters with mouse clicks. Beautifully Intuition-based, Diga! can be operated with pull-down menus and the mouse, or easy mnemonic keyboard combinations. For example, pressing either ALT key with B sends a break to the host, Amiga-H hangs up the phone and Amiga-P gets you the Phone Book menu. Once there, D will dial a phone number or ALT-D will redial it a specific number of times.

Of course, macros, phone books and scripts are important, too. Macros are previously entered text that can be sent at the press of a key or two. Diga! saves configuration files that include every changeable aspect of the program, each of which can hold up to 50 macros (the function keys ►

used plain, shifted, or in combination with Control, ALT or the Amiga keys) of up to 80 characters each. To enter one, pull down the Phone menu and select Macros, click in the Plain, Shifted, etc. box, then click again on an F1 to F10 input line and type away.

Diga!'s Phone Book is power-packed, too, but it's confusing to set up and use because it's poorly documented. Most communications programs show a list of previously entered host names, phone numbers and parameter settings that you can see all at once. Diga!, however, offers an input requestor for each entry and searches through them alphabetically, showing one at a time. To auto-dial, the entry for the host you want to call must be on the screen, but you can scroll through the entries with the cursor keys, though it's undocumented. To enter a previously saved configuration or script file, click squarely on Configuration and Script in the phone book to bring up a disk access requestor and continue until you click on the file name itself. Diga! looks for files in their respective directories, so if they're not there or the correct path isn't shown, it can't implement them.

Follow the Script

Scripts—preprogrammed instructions Diga! carries out when you auto-dial—are capable of logging onto a system, capturing mail and messages, transferring and saving files, signing off and so on, completely unattended. You can use 30 commands and access AmigaDOS, but you must construct scripts from their definitions in the manual in a programming-like environment using an external text editor. Diga! accommodates ASCII files along with those from MicroSmith's TxEd or IFF text files from New Horizon's ProWrite or the Notepad. It makes good use of the Amiga's clipboard, allowing you to copy files there, multitask or quit Diga! or the creation program, and paste text back from clipboard memory.

Diga! does most things exceedingly well, but the cost is large memory requirements; under 100K bytes are left on a 512K system when you start Diga! from Workbench. Its only real programmatic shortcomings center around specialized terminal emulations that are loaded from disk as needed. Neither VT100/52 nor Tektronics is stable on an unexpanded machine. You'll have better success by setting VT100 to 24 lines (with or without overscan) using a transparent cursor and running it from the CLI. However, it won't handle double-wide characters, graphics and 132-column overscan. Since Diga! emulates a Tektronics 4010, it won't do 4110 or 4115 extended plot commands. An external translation program converts Tektronics graphics to Aegis Draw and Draw Plus format.

With these exceptions, most of Diga!'s other blemishes are minor. There's no line-by-line prompted buffer transfer, you can't control the incoming end-of-line format (EOL) or add filenotes or check free disk space. An on-screen clock would be nice, but more serious is the absence of a split-screen chat window. The program manual is an interesting 94-page mixture of simplistic advice to novices spiced with techno-speak about parity and logic bits. More attention to detail and an expanded tutorial would be helpful. But remember, communications software is designed for reaching other users. Diga! itself is beautifully implemented and there are lots of helpful people online. Don't be afraid to try. Aegis wasn't.

Diga!
Aegis Development Corp.
2210 Wilshire Blvd., Suite 277
Santa Monica, CA 90403
Technical support: 213/392-9972
$89.95
512K required.

Microfiche Filer

Proof that a database can be fun.

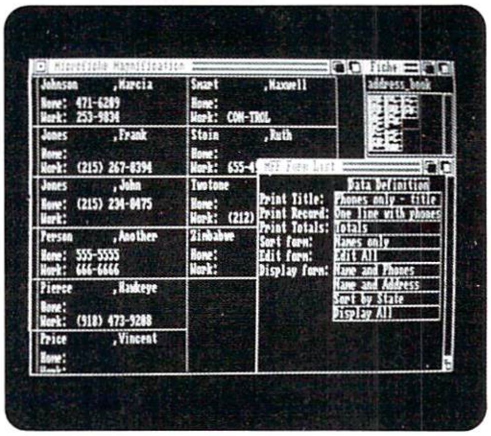
By Ted Salamone

THE AMIGA IS a truly inspiring machine. Take Microfiche Filer for example; a flat file, graphic database. Instead of following the pack by developing a "me-too" product, Software Visions offers Amiga users a real alternative, a unique means of cataloging, manipulating and retrieving data, based on the microfiche format. In the program, a roving magnifying glass expands portions of data for review and retrieval.

Not copy protected, this one-disk application installs easily on hard drives. It also works well with one or two floppy drives. The manual discusses setup procedures admirably and does a nice job of stepping you through the sample address book on the disk. Once through the tutorial you feel as if it's time to move on—only it isn't.

Despite sample files, adequate reference sections and relatively comprehensive definitions, it is difficult to create your own database the first time out. The manual doesn't explain file and record setup in a coherent manner; nor does it clearly spell out the procedures to format reports. If these instructions were as clearly defined and as succinctly grouped as the address book tutorial, Microfiche Filer would be nearly flawless in execution and design.

The saving grace, which lessens the learning curve, is the intuitive nature of the application. Just apply a little common sense and mix liberally with the fine art of software experimentation.



Entire database (right) and magnified piece.

This experimental odyssey is not as bad as it sounds, however, because Microfiche Filer is fast. Sorts, printer output, selects, nearly all actions (even screen redraw) work at a more than adequate pace. Functions perform with minimal, certainly acceptable delays.

Menu commands and editing functions have easy to learn and easier to use keyboard equivalents. While working with records or entire databases you can make a copy by merely dragging the image until its border colors change. Release the button and you have a perfect clone. This is a very handy way to enter data in records that are nearly identical.

Healthy Limits

Despite the apparent dearth of logical operators for selects, Microfiche Filer is surprisingly robust and flexible. Equal to, greater than, less than, chaining and character positional (first or last in a field) operators comprise the core, though a few others are also available.

Fields are selected on one at a time; however, multi-pass selects can produce extremely well-defined or highly discrete information and reports. This multi-level selection process is not difficult, time con- ►

NEW for the AMIGA

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suming or ornery in any way. By breaking the select criteria into small, discrete steps, users have better control over the work being performed and have less damage to reverse if there is an operator or computer error.

While on the topic, Microfiche Filer does very well in the error handling category, right down to its emergency shutdown (and reconstruction) capabilities. This is just another example of the thoroughness behind the design and execution of the program.

Selected records appear in reverse image for quick identification. Hardcopy output is facilitated through pre-designed report formats, a number of which can be kept on hand. Drop the desired report format in the report output box and you're done. Sorts and edits are handled exactly the same way. The ease with which changes are handled is frightening, though pleasantly so.

Graphically Speaking

Besides manipulation and storage of text based information, Microfiche Filer aptly handles graphics or picture-oriented databases. IFF graphics can be entered, edited, displayed or printed. Limited to four colors at a time, Microfiche Filer nevertheless accepts pictures of up to 32 colors by squeezing or coding the 32 original hues into four. Via a color editor, you can designate the coding process, thereby maintaining a high degree of control over visual data.

Graphics may be displayed in their original resolution and colors in a separate window for detail verification. Multiple pictures can be displayed simultaneously, though this does have a slight affect on performance. Heavy graphics users will appreciate Microfiche Filer's ability to directly access up to eight megabytes of RAM.

Microfiche Filer is a database with a difference. Modifying records, adding or deleting fields, moving their position about the screen or hardcopy is just a click and drag away. Changing the attribute of a field takes a single click. Even when I wasn't quite sure what was going on, or what I was doing, I still got great results. It took a little time, but the results were worth the investment.

Microfiche Filer
Software Visions Inc.
26 Forest Road
Framingham, MA 01701
617/877-1266
$99
512K required.

A-Talk Plus

"Moving pictures" takes on a whole new meaning.

By Peggy Herrington

A-TALK PLUS from Felsina Software lets you talk to just about anybody. Besides addressing popular online services, it makes the Amiga emulate a dedicated Tektronics 4010/4014 graphics terminal. A-Talk Plus offers five emulations in addition to Tektronics. TTY and TALK, which opens a moveable split-screen chat window, are both well suited for bulletin board systems. TALK is also good for conferencing on commercial networks. ANSI is used on networks and those boards offering color graphics displays. The old standbys for minicomputers and mainframes, VT100, VT52 and H19, round out the list.

A-Talk Plus is well suited for access to a business or school computer system with standard Xmodem, with optional automatic Xmodem padding stripper, Xmodem CRC and Kermit, which lets you strip or convert file names. Transfers may be made in ASCII or binary format at six baud rates (300 to 19,200). Since it shouldn't be on during Xmodem transfers, Xon/Xoff handshaking can be toggled. The on-disk instructions in READMEFIRST will solve problems with timeouts on C-Kermit systems. The text capture buffer has a view window, though it's not scrollable. Incoming end-of-line conversations are also possible. You can change parity, duplex and other communications parameters, plus set the speech synthesizer to read data aloud as it is sent or received. A filter screens out everything except letters and numbers, so you don't have to listen to extraneous characters used online as text enhancers. A-Talk supports audo-dial, redial, answer and hangup procedures on a variety of modems (Cermetek, DF03, DF100, DF200, Gendata, Hayes, Penril, Racal, USR-212a and Ventel), and the manual has tips for using other modems and three- or seven-wire RS-232 protocols.

For automatic log-on, you can create scripts in a separate text editor using 10 special commands. Editable sample scripts are provided for Telenet, TYMNET, CompuServe, NewsNet, DIALOG, MCI, Official Airline Guides, Western Union and Dow Jones. Although not as elaborate as Diga!'s script command set, they are explained better in the manual. A-Talk's phonebook will save up to 10 numbers with file names of the automatic log-on scripts. From the Dial menu you can enter 20 macros for each phonebook entry, sent later to the host by pressing the function keys shifted or unshifted. Right-Amiga key combinations are available for most options, and are listed in the manual. Unlike Diga!, many of these shortcut key combinations are not very intuitive.

From the Project menu, you can change disk directories and open a new CLI. A-Talk Plus will save icons automatically with corresponding downloaded files, if you wish. If you want to see more of the transmitted text, you can switch to a small font and display up to 132 characters per line in interlace mode.

Drawing from the Mainframe

Tektronix 4010/4014 emulation lets you use your Amiga to communicate with and use graphics command sets and text editors found on many professional and university computers, such as the AT&T Unix System V, on which I tested it. Plus lets you chose between four special fonts (graduated in size) and works exclusively in interlace mode. You can switch between two- or four-color screen displays and save images you create or download to disk in either IFF or Aegis Draw/Draw Plus format.

In Tektronics emulation mode, A-Talk Plus is flexible and easy to use with mouse pull-down menus and Amiga key combinations, but using the commands on the host computer it connects you with is not an experience I would recommend for the faint of heart. By comparison, explaining how to multitask on the CLI is child's play. Graphics commands on a Unix V system are sophisticated and include arc, zoom, pan, circle, line, box, rotation and move. Provided you know how to use them, they can result in images of 3-D wire frame models. With A-Talk Plus on the Amiga, you can use the host system to draw images and add text as with a regular Tektronics terminal, plus you can capture the images on disk and manipulate them further offline.

Though it could be more intuitive, A-Talk Plus does what it was designed to do. I'd use it for accessing business and school systems along with many electronic bulletin boards, although there are faster error-checking protocols than Xmodem. Despite the chat window being moveable, I am annoyed that its default position hides incoming text at the bottom of the screen. Like

Diga!, A-Talk Plus is not copy-protected and comes with Workbench 1.2. It may not be the fanciest program around, but A-Talk Plus is a good, solid alternative for several specialized situations.

A-Talk Plus
Felsina Software
3175 South Hoover Street, Suite #275
Los Angeles, CA 90007
213/669-1497
$99.95
512K required.

Galileo

Star light, star bright. First star on my Amiga tonight. . .

GALILEO IS THE best astronomy program on any personal computer. Using the Amiga's graphics and computational power, it can display the night sky as it appears from any location on Earth for any time and date within 400 years of the present. Inspite of all this, I still can't recommend Galileo as a legitimate observational tool; at best, the program is useful for learning some of the concepts behind observational astronomy.

A menu-driven program, Galileo can plot the location of 1,600 stars, planets and deep-sky objects (galaxies, diffuse nebulae, etc.). It can use both the equitorial coordinate system and a local altitude-azimuth system. Based upon the longitude, latitude and time you enter, Galileo plots and displays the prominent celestial objects in your field of view. Although the plotting function is slow in relation to other Amiga graphics programs, it is surprisingly fast for an astronomy program. The calculations needed to create the night sky are quite intensive.

The program has many interesting options. It can plot the path of planets against the stars to observe retrograde motion. You can have Galileo show the names of the planets, bright stars, constellations, Messier objects and some NGC (New General Catalog) objects. It will even display the outlines of constellations so you can learn to identify them in the night sky. Other options let you search for planets and constellations and to get a magnified view of the planets. The What's Up function tells you which planets are in the morning and evening skies of the time and place you entered.

I am impressed with the features and wealth of detail in Galileo, but I don't see the program replacing a good astronomy field guide or star atlas. Costing a lot less than Galileo, an astronomy field guide contains a lot more information and is portable too. (I don't want to lug around an Amiga in addition to my Celestron C-8 scope.) Galileo is useful for learning about the equitorial coordinate system and for investigating the position of stars and planets on a particular date, but it is not a very useful tool for observational astronomy. Unless your interest in astronomy is more educational than observational, you should pass on Galileo.

—*B. Ryan*

Galileo
Infinity Software Ltd.
1331 61st St., Suite F
Emeryville, CA 94608
415/420-1551
$59.95
512K required.

Game Shorties

Grand Slam Tennis

GRAND SLAM takes you through the four major tournaments of professional tennis: Wimbledon, the U.S. Open, the French Open and the Australian Open. Playing surfaces range from the grass courts of Wimbledon and the Australian Open to the clay surfaces of the French Open and the hard surfaces of the U.S. Open. Each court reflects the peculiarities that the actual site presents to players.

An impressive number of options show up in the menus. On the utility side, you can save or restore games, start new games or change courts. Three types of racquets are available (wood, metal or graphite) with four different tensions. You can control the speed of the game, the quality of your opponent, even the weather, and you can check your Grand Slam score at any point.

Grand Slam is a one-player game only. To control your player, slide the mouse in the desired direction and click the left button to swing the racquet. Slices, lobs, smashes and topspins are controlled from the nu- ►

meric keypad, as are the speed and power of the shot. You can even protest line calls!

But the game doesn't quite cut it, mainly because of the mouse control. For some reason joystick control was not built in (the manual implies it will be available shortly), and the mouse is simply not a good playing device. You'll find your player moving all over the court, missing shots and losing points as a result. In a game that seems to offer so much, this is unfortunate.

Grand Slam is almost successful, but not quite. It badly needs joystick control and an improved means of hitting lobs, slices and other special shots. The graphics are good (but not great), the sound effects are better and the ability to protest calls is charming. A few changes and this should be a fine game. As of now, it's only pretty good. *($49.95, Infinity Software Ltd., 1331 61st St. Suite F, Emeryville, CA 94608, 415/420-1551. 512K required.)*

—Neil Randall

Silent Service

THE BEAUTY OF Silent Service—the WWII submarine-simulation game from MicroProse—is that it puts you squarely into the shoes of a U.S. submarine commander. You don't have to deal with the picayune tasks that are handed out to subordinates on a real submarine. As a result, you can concentrate on intercepting and sinking Japanese shipping without getting sunk yourself.

While you can practice the game in individual convoy actions, the heart of Silent Service is the war patrol. Here, you pilot your submarine on a map of the southwest Pacific until your crew sights an enemy convoy. You then maneuver your sub to intercept the convoy and make an attack. As you close with the convoy, you can zoom in on the map to better show your position in relation to the enemy. You can also increase the rate that time passes for long pursuits.

Once in contact with the convoy, you can go for a submerged or surface attack. While surfaced, you can use torpedoes or your deck gun; submerged subs can use torpedoes only. If you sink the enemy, the tonnage of the ships sunk is added to your score. Depending upon the difficulty factor of your mission, you could qualify for the Hall of Fame at the end of a patrol.

The graphics in Silent Service are good while the sound is average, but these are secondary in evaluating this game. Silent Service stands or falls on its ability to engross you in the action; on this score, Silent Service is a resounding success.

The game is not without faults. I find it hard to believe that a U.S. Fleet submarine could sink a Japanese carrier with a four-inch deck gun in daylight as I did in Silent Service. I also found the Amiga version to be too easy in general. With a little experience, it was nothing for me (and other *AmigaWorld* staffers) to rack up 80,000 or more tons on a level five patrol. There are reasons the Amiga version is too easy. First, the enemy escorts are not as strong as in other (C-64 and Apple) versions I've played. Second, sightings of juicy targets like carriers and cruisers are much more frequent in the game than they were in World War II.

One other recurring problem I had was that the game hung up on me with alarming frequency—as many as one-fifth or one-sixth of the patrols I started ended with a hung computer. All the copies of the program I tried exhibited this problem—on several different Amigas. Two situations seemed to increase the odds of a hung computer: busy situations where you are diving, turning and firing torpedos all at once, and long pursuits where the program just seems to give up. I suspect the copy-protection scheme interferes with the normal running of the program. MicroProse is now shipping an update that should correct the problem.

Silent Service is not a perfect simulation, but it is a great game. Although you might have to take advantage of the 90-day warranty on defective media, this game is worth the hassle. *($39.95, MicroProse, 120 Lakefront Dr., Hunt Valley, MD 21030, 301/771-1151. 512K required.)*

—B. Ryan

The FaeryTale Adventure

IN THE MAGICAL land of Holm three brothers set out, one at a time, to defeat an evil necromancer and recover a magic talisman, making the kingdom safe once again. Sound familiar? Well, no one said you had to have a killer story line to make an enjoyable game. The FaeryTale Adventure is a graphic adventure game where you explore the countryside, fight bad guys, gather magic items, get stronger and quicker with each foe killed, get revived when you get killed and more or less try to survive long enough to gather enough stuff to survive even longer while you wander around trying to find the necromancer, return the talisman and win the game. Pretty

straightforward.

The graphics and scrolling are very good aeriel views. The sound is good. The music isn't bad but gets annoying after a few hours and is important to game play, so it shouldn't be turned off. You control the characters with either the mouse, the keyboard or a joystick (using a combination of keyboard and mouse is probably the best). The screen has your map, a narration box that gives vital statistics and messages, a compass used for movement and combat directions and a command box with a number of options such as Magic, Talk, Buy, Items and Game. When any of these are selected, the box displays the individual command menus; all can be selected with the keyboard.

The best feature of The FaeryTale Adventure is the size of the play map—it's gigantic. The world is an island (144 screens × 100 screens large) including roads, forests, mountains, deserts, swamps, caves, mazes, castles, inns, towns and cities. It takes a L-O-N-G time to explore. There aren't a lot of options in The FaeryTale Adventure, so it doesn't take long to master the play. (That doesn't mean master the game; that could take forever.) The bad guys, at first, are impossible to get past, but later they become more of a nuisance. Also, because of the system of movement, your fingers get tired from continuously holding down the mouse button.

The FaeryTale Adventure is a good game. It is not earth shattering, mentally provocative, or terribly fast paced. It is well constructed, has above average sound and graphics and the size of the play area is enough to keep you interested for quite a while, even if you never find the necromancer. *($49.95, MicroIllusions, 17408 Chatsworth St., Granada Hills, CA 91344, 818/360-3715. 512K required.)*

—G. Wright

Sinbad and the Throne of the Falcon

SINBAD AND THE THRONE of the Falcon maintains the graphics and music excellence of Mindscape's Cinemaware series while correcting some of the playing problems of past games. Until now, Cinemaware products have been very pretty but quite tedious; Sinbad offers a specific quest, a rich world and a considerable amount to do.

Because these games are labelled "interactive cinema," they should resemble movies—good pictures, entertaining music, smooth shifts from scene to scene, an interesting plot. The graphics are sharp and colorful (although not as realistic as those in Defender of the Crown), the music is superb (the best in the series so far), and the plot is fine. Scene shifts are at the mercy of the Amiga's disk drive, and unlike SDI, this game makes no provisions for dumping scenes into RAM for those with RAM expansion. As with any game with extensive disk access, you'll grow tired of waiting for the drive to stop, but this isn't really the game's fault.

Princess Sylphani (who has grown into a woman since you last saw her) has discovered that her father, the Caliph, has been transformed into a falcon. As Sinbad, your jobs are to manage the city's defense in his absence and to quest for a cure for the Caliph's curse. Managing the city's defense demands moving military units from hex to hex on a map of Damaron, while questing involves traveling from place to place (on foot or by ship) and talking to characters.

The game's most spectacular graphic display is the map of the world. When you press the mouse button, a magnifying glass appears where the cursor is, enlarging that particular area to the point where you can distinguish towns, rivers and harbors. You can drag the magnifying glass across the screen to study the route of your journey. To move, you simply select a new location from the menu or sail over the sea. The controls are simple and functional.

On your voyage you will battle all sorts of interesting monsters, and you must master the fencing sword, slingshot and crossbow. Actually, none of these weapons is particularly well handled, and you will eventually tire of them. But the game offers enough variety and things to be discovered that the joystick functions never overtake the quest itself. The graphics of the individual scenes are always very interesting.

What sets Sinbad apart from the other Cinemaware packages, though, is its ambience. The various musical themes sound like the old Sinbad movies, and the artwork looks, well, Bagdad-ish. A gypsy, a seductress and even a genie show up to help you, *if* you talk to them properly. The Cinemaware series tries to capture the flavor of the old Hollywood adventures, and with Sinbad and the Throne of the Falcon it has begun to succeed. *($49.95, Mindscape Inc., 3444 Dundee Road, Northbrook, IL, 312/480-7667. 512K required.)*

—Neil Randall ■

Help Key

Without Bob "Bitplane" Ryan to guide them, perplexed Amiga users turn their pleading eyes to L. R. ("Load-and-Run") Wallace.

By Louis R. Wallace

Stand By to RAM

Q: I'm having trouble figuring out the purpose of the RAM disk icon on Workbench 1.2. Can I get the icon to boot up my RAM disk? If so, how, and if not, what exactly do I use it for? Why does the RAM disk window always indicate the RAM disk is full? Why does INFO always show the RAM disk full?

Tim Anders
St. Paul, MN

A: The 1.2 Operating System added the RAM disk icon to the Workbench screen, so users would have easy access to this very fast pseudo-drive. With version 1.1, it was accessible only from the CLI interface.

The RAM disk is, of course, not a real disk drive. Rather, it is a logical drive with all the programs and data stored in the computer's RAM memory, where it can be accessed at high speeds not available by any other means. But while you can use it from the Workbench, in order to see the RAM disk icon, you must first access this drive. Simply add the command DIR RAM: to the Startup-Sequence file in the S directory of your Workbench disk. Once the RAM disk is used in any way, the icon appears. You can then open the RAM disk window with the mouse and copy programs, files, even whole directories into it.

The INFO command and the RAM disk window always show the disk as full because it always *is* full. When you store a file in RAM, AmigaDOS allocates only as much as it needs. Likewise, when you delete a file from RAM, the freed memory is restored to the Amiga for other tasks to use.

Since every byte of RAM used in the RAM disk is memory you cannot use for other purposes, make sure you have enough memory before trying to use a RAM disk. Users with only 256K should not even attempt to use it, and even 512K does not leave you much memory to spare for such luxuries. But when you have 1MB or more RAM available, the RAM drive can become a very important part of the Amiga's capabilities.

In Error

Q: On several occasions, I've tried to run the programs you've printed in AmigaWorld *and many times the program wouldn't run. Sometimes I'm able to locate the error myself; however, I'm not a true programmer so often I cannot.*

Is there a number to call to correct these misprints or program errors? I am specifically referring to the Music Demo program listing 1 on page 44 of the July/August '86 issue. I get "illegal function call." Please advise!

Name Withheld

A: I wrote the program you mentioned (Making Music With Amiga Basic), and I assure you it worked fine when it was submitted to *AmigaWorld*. It was then checked and rechecked by the magazine's staff. After receiving your letter, I typed the program in again, and it worked properly.

We all make mistakes. That includes writers, programmers, editors *and* readers. You indicated there were either misprints or a bad program causing your problems, but perhaps you should have considered user error. I don't mean to be critical of anyone who suggests I (or we) make an error. If you think a program or comment is wrong, let us know. But please, check your own efforts first.

Proofread your typing carefully and don't assume anything is correct. Are there periods where commas should be, or vice versa? Is everything spelled and capitalized correctly? Did you use the correct number of spaces? Are your lists accurate? If all else fails, have someone read the magazine's listing aloud while you follow along on your printout.

Basic Needs

Q: My Amiga 1000 came with Amiga Basic. Lately, I have been seeing a number of very good public domain programs written in ABasic and requiring ABasic. Where can I get a copy of ABasic? Just how different is it from Amiga Basic? Do I need additional documentation?

Greg Benoit
Fitchburg, MA

A: ABasic was the first Basic shipped with the Amiga. It was not very popular, being somewhat buggy, requiring line numbers and offering *no* animation support, and was discontinued in favor of the current Amiga Basic within a few months of the Amiga's release. It did have some very good commands for sound and music, much better than those in Microsoft's Amiga Basic. But I don't think you can buy it anymore, unless Metacomco (26 Portland Square, Bristol, England BS2 8RZ) has a few copies left. Your best bet would be to get it from someone who bought an Amiga when it was first released (Fall '85). You will need the manual as well, as the language has its own syntax and rules which differ from Amiga Basic. It is not a public domain package, so it would not be appropriate to simply copy it and its manual, but someone should legally be able to give or sell you their original disk and manual.

Double-Talk For the Amiga

Q: I found an apparent contradiction in the Nov./Dec. '85 and July/August '86 Help Key columns. The question was what is the difference between single- and double-sided disks. In the '85 issue, it was stated that double-sided disks must be used on the Amiga. However, in the '86 issue, you stated that the only difference between the two disks was that the single-sided disk was only verified on one side, and that the single-sided disk would not harm the drive heads. I have been told by several dealers that single-sided disks lack a protective coating which may cause premature deterioration of the disk-drive heads. If the single-sided disks do lack a protective coating, I hope that manufacturers of these disks (as ►

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Champ Baseball	Call
Champ Basketball 2 on 2	$29
Champ GFL Football	Call
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CALL FOR *FREE* CATALOG

well as AmigaWorld) *would make it known that they are bad for the Amiga.*

M. Farmakis
Grand Forks, ND

A: Over the years I have heard many stories about using the wrong media (single/double sided, single/double density). I once asked a manufacturing company about it, and this is what they told me.

Disk media is graded to its quality. For our purposes, we will call the best media double-sided double-density. Both sides of the sheet of media is checked for its fitness as double-density media. If both sides pass, it is called double-sided double-density. If only one side passes, it is single-sided double-density. If neither side passes the double-density quality check, but both sides meet the specs for single density, it is called double-sided single-density media. If only one side meets single-density specs, it is single-sided single-density media. If it fails this it is discarded. What does this mean to users? The Amiga needs double-sided, double-density disks. If you are using lesser-quality disks, that means that the media itself is not fully reliable for storing your data and programs; it is much more likely to generate a disk error and have corrupted files than the proper media. While there may be a remote possibility of a hardware problem, software or data errors are the real danger. Moral: Use the proper disks!

Driving You to Print

If our recent onslaught of letters is any indication, the number of available Amiga printer drivers is not keeping up with the number of available printers. While the Preferences drivers suffice for the majority of users, many people are still left without proper printer support. A universal driver isn't feasible (printers are usually far too different), but a program to generate drivers is quite possible. Sometime back I heard of a company that had a printer-driver creation program. After some investigation, I discovered that the company is:

The Software Supermarket
3162½ Delaware Ave.
Kenmore, NY 14217
716/873-5321

I talked with Paul Boden from The Software Supermarket, who said they only sell the program to dealers (or in some cases users groups) for $150. Dealers in turn use it to make drivers for their customers and charge $30 to $35 apiece. To locate a dealer in your area who can supply the printer-driver service, call The Software Supermarket. If there are no dealers near you, they will sell you a driver directly if it is available. Currently, they have nearly 100 drivers on hand, including some for 24-pin printers.

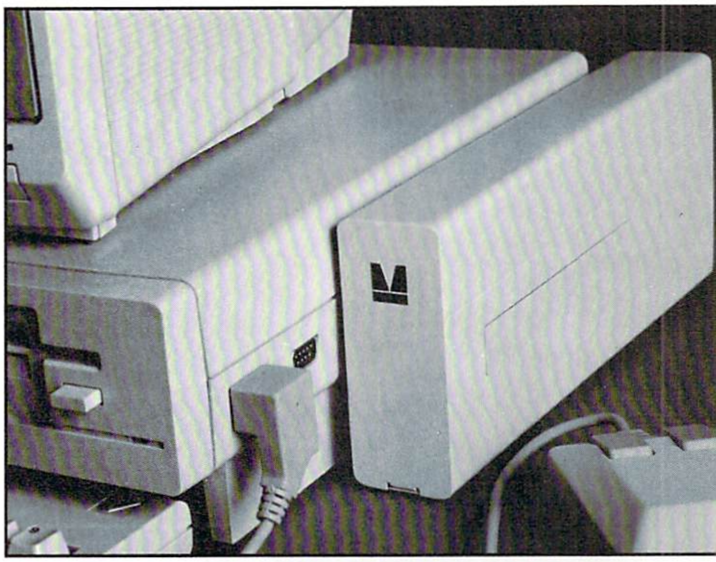
Amiga users groups are another good source for drivers. They may already have a driver for your printer in their libraries. In addition, there are some drivers available on the Fred Fish Public Domain disks as well as the Amicus network disks.

AmigaWorld is currently collecting public domain software that will be made available in the future to new (and established) user groups, allowing the groups to have an "instant" library available for their users. If you or your group would like to contribute to this worthy cause, please send the PD software on a disk to *AmigaWorld*. Programs like custom printer drivers for non-Workbench-supported printers are especially welcome, and will be made available to anyone who needs them. ■

AVAILABLE NOW!

StarBoard2

Auto-Configuring
Fast RAM
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User Expandable
from 512k to
2 Megabytes
Bus Pass-Through
MultiFunction
Option: battery/
clock, FPU,
parity, Sticky-Disk



If you've owned your Amiga® for a while now, you *know* you definitely need more than 512k of memory. You probably need *at least* double that amount...but you might need as much as an additional two megabytes. We want to urge you to use **StarBoard2** as the solution to your memory expansion problem –and to some of your other Amiga-expansion needs as well!

It's small, but it's BIG–

Since most of you want to expand your Amiga's memory without having to also expand your computer table, we designed **StarBoard2** and its two optional "daughterboards" to fit into a sleek, unobtrusive Amiga-styled case that snugly fastens to your computer with two precision-machined jackscrews.

The sculpted steel case of **StarBoard2** measures only 1.6" wide by 4.3" high by 10.2" long. You can access the inside of the case by removing just two small screws on the bottom and pulling it apart. We make **StarBoard2** easy to get into so that you or your dealer can expand it by installing up to one megabyte of RAM on the standard **StarBoard2** or up to two megabytes by adding in an Upper Deck.

This card has decks!

The basic **StarBoard2** starts out as a one megabyte memory space with 0k, 512k, or one megabyte installed. If you add in an optional **Upper Deck** (which plugs onto the Main Board inside the case) you bring **StarBoard2** up to its full two megabyte potential. You can buy your **StarBoard2** with the Upper Deck (populated or unpopulated) or buy the Upper Deck later as your need for memory grows.

And you can add other functions to **StarBoard2** by plugging in its second optional deck –the Multifunction Module!

StarBoard2: functions five!

If we count Fast Memory as one function, the addition of the **MultiFunction Module** brings the total up to five!

THE CLOCK FUNCTION:

Whenever you boot your Amiga you have to tell it what time it is! Add a MultiFunction Module to your **StarBoard2** and you can hand that tedious task to the battery-backed, real-time clock/calendar. A small piece of MicroBotics software in your WorkBench Startup-Sequence reads the clock and automatically sets the time and date in your Amiga. And the battery *is* included (we designed it to use an inexpensive, standard AAA battery which will last at least two years before needing replacement).

THE FLOATING POINT FUNCTION:

If any one aspect most characterizes the Amiga it's *fast* graphics! Most graphic routines make heavy use of the Amiga Floating Point Library. Replacing this library with the one we give you with your MultiFunction Module and installing a separately purchased Motorola 68881 FPU chip in the socket provided by the Module will speed up these math operations from 5 to 40 times! And if you write your own software, you can directly address this chip for increased speed in integer arithmetic operations in addition to floating point math.

THE PARITY CHECKING FUNCTION:

If you install an additional ninth RAM chip for every eight in your **StarBoard2**, then you can enable *parity checking*. Parity checking will alert you (with a bus-error message) in the event of any data corruption in **StarBoard2**'s memory space. So what good is it to know that your data's messed up if the hardware can't fix it for you? It will warn you against saving that data to disk and possibly destroying your database or your massive spreadsheet. The more memory you have in your system the more likely it is, statistically, that random errors will occur. Parity checking gives you some protection from this threat to your data residing in Fast RAM. Note that the Amiga's "chip" RAM cannot be parity checked.

THE IMMORTAL MEMORY DISK FUNCTION (STICKY-DISK):

When you've got a lot of RAM, you can make nice big RAM-Disks and speed up your Amiga's operations a lot! But there's one bad thing about RAM-Disks: they go away when you re-boot your machine. Sticky-Disk solves that problem for you. It turns all of the memory space inside a single **StarBoard2** into a Memory Disk that will survive a warm-reboot! When your Amiga attempts to grab a **StarBoard2** in Sticky-Disk mode, a hardware signal prevents the system from acquiring the **StarBoard2** as FastRAM (and thereby erasing your files) –instead it is re-recognized as a Memory Disk and its contents are preserved intact. If you want to work rapidly with large files of data that are being constantly updated (such as when developing software) you can appreciate the Sticky-Disk!

Fast RAM –no waiting!

StarBoard2 is a *totally* engineered product. It is a ZERO WAIT-STATE design, auto-configuring under AmigaDOS 1.2 as Fast RAM. Since AmigaDOS 1.1 doesn't support autoconfiguration, we also give you the software to configure memory in 1.1.

Any applications software which "looks" for Fast RAM will "find" **StarBoard2.** And you'll find that your applications run more efficiently due to **StarBoard2** on the bus.

A passing bus? Indeed!

What good is an Expansion Bus if it hits a dead end, as with some memory cards? Not much, we think –that's why we carefully and compatibly passed through the bus so you could attach other devices onto your Amiga (including another **StarBoard2**, of course!).

The sum of the parts...

A really nice feature of the **StarBoard2** system is that you can buy exactly what you need now without closing off your options for future exapansion. You can even buy a 0k **StarBoard2** (with a one megabyte capacity) and populate it with your own RAM (commonly available 256k by 1 by 150ns memory chips). When you add **StarBoard2** to your Amiga you have a powerful hardware combination, superior to any single-user micro on the market. See your Authorized Amiga Dealer today and ask for **StarBoard2**

SUGGESTED RETAIL PRICING:	
StarBoard2, 0k (1 meg space):	$349
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StarBoard2, 512k (1 meg space):	$495
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MultiFunction Module:	$ 99
also available:	
Standard 256k memory card:	$129
MAS-Drive20, 20 meg harddisk:	$1495
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MicroBotics, Inc.
811 Alpha Drive, Suite 335, Richardson, Texas 75081 / (214) 437-5330

Circle 103 on Reader Service card.

What's New?

Whether you need a program to help your business, or something just for fun, search no further.

Compiled by Linda Barrett

Two Strokes Over PAR

Want to publish a magazine but need some software and a loan to get started? PAR Software can help on both counts. **Express Paint** combines a full-featured paint program with text manipulation features. On the program's graphics side, you can create pictures up to 1,024 × 1,000 pixels and edit them on a screen of 758 × 470 pixels. You can merge several graphic files into one image, use multiple brushes or cuts, distort your brushes or use the Zoom Lens for detailing. Once you import an ASCII text file, you can format it into any shape, instead of just rectangles. For large projects, the printer interface allows for poster-size multiple page printing.



Express Paint from PAR Software

To help you track the money you've invested in your new venture, Ea$y Loan$ monitors individual and business loans. You can customize a loan's amortization schedule with partial principle payments, partial or total balloon payments, negative amoritizations and variable interest rates and payments. If you're trying to figure out how much you can borrow, the program will calculate any missing variables such as your monthly, quarterly or yearly payment, the interest rate, the length of the loan and even the principal. If you need to report your loan's progress to your supervisor (or spouse), you can print out a complete loan table.

Express Paint! retails for $79.95, while Ea$y Loan$ sells for $39.95. For further details, contact PAR Software Inc., PO Box 1089, Vancouver, WA 98666, 800/433-8433.

Something Old, Something New

Whether you're interested in business or programming, Abacus can help. On the business side are two new word processors, **TextPro** and **BeckerText**, and **DataRetrieve**, a rewrite of the popular Atari data manager. Labeled an intermediate word processor, TextPro features screen formatting, automatic hyphenation, 30 definable function keys and flexible printer driver installation. You can even include graphics in your text. For writers with more advanced needs, BeckerText allows up to 999 characters per line, printing of up to five columns, automatic hyphenation, decimal tab settings and numeric calculations within the text. The online dictionary provides type-along spelling correction. Once your book is finished, you can generate an index for it.

If you just need to straighten out your files, DataRetrieve lets you access up to eight files at a time, index up to 80 different fields, create and work with subsets of a file, change file definitions and formats and display data fields in different type styles and sizes. Besides supporting the RAM disk, it can handle records of up to 64,000 characters and numeric values with up to 15 significant digits.

For programmers, Abacus ported over **AssemPro**, a machine-language development package. It contains an integrated editor, a macro assembler with 32-bit arithmetic, a debugger with 68020 single-step emulation, a dissembler and a reassembler.

TextPro and DataRetrieve both sell for $79.95, AssemPro is $99.95 and BeckerText is $150. Contact Abacus, 2201 Kalamazoo SE, PO Box 7219, Grand Rapids, MI 49510, 616/241-5510.

Perfect Port

IBM had it, Apple had it, Data General had it, even the DEC Rainbow had it, but not the Amiga. . .until now. **WordPerfect** for the Amiga is shipping. Translated from the best-selling IBM word processor of the same name, this WordPerfect lives up to its heritage. Besides basic text manipulation, the program automatically numbers and situates footnotes and endnotes, creates a table of contents or index for your document, allows up to five parallel text columns on screen, lets you create numeric tables in your document and even calculates math functions. If you have problems thinking of the right word, or know it but can't spell it, a thesaurus and 115,000-word dictionary are included. WordPerfect also supports macros, a merge routine and over 200 printers. Printer queueing lets you edit while you print. Files are compatible with version 4.1 of the IBM edition.

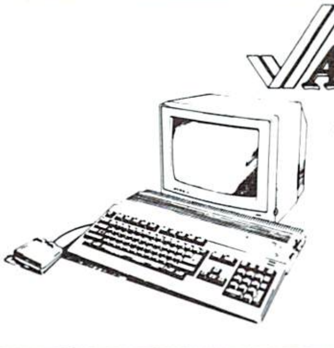
Don't worry about not being able to master all the commands, the manual comes with graduated lessons and a reference section. Colored templates and the WordPerfect Learn disk complete the tutorial. An intuition interface, as well as keyboard commands are supported. At $395, WordPerfect is still a bargain. For more information contact WordPerfect Corporation, 288 West Center St., Orem, UT 84057, 801/225-5000. ►

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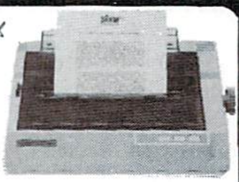
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Speed Racer and Rainbow Bright

When you're behind the wheel of a Ferrari, Lamborghini, Lotus, Porsche or Corvette, it is very tempting to floor the accelerator and see just what the car will do—tempting but difficult in **Test Drive**, Accolade's driving simulator. Once you choose your car, you must drive a



Take a Test Drive.

mountain section of a highway within a certain time limit to gain performance points and continue. It sounds easy, but along the way you must contend with slow vehicles in your lane, oncoming traffic, falling rocks and the highway patrol. Keep an eye on your radar detector. The game ends when you run off the road, are pulled over by the police or fail to reach your destination within the given time limit. Your final score is based on your total driving time.

Each car handles (accelerates, brakes, steers, etc.) exactly like its counterpart with a five- or six- figure price tag. The on-screen display is a view from the driver's seat complete with dashboard, rearview mirror, radar detector and an inset showing the gearshift knob. For $44.95, Test Drive is a lot cheaper than a new car. (No trade-ins please.)

If your hobbies run along more sedate lines, you should investigate Accolade's second release, **The Graphics Studio**. A full-featured paint program and graphics editor, The Graphics Studio offers a palette of 512 colors, a pattern library with 24 options and an 8½ × 11-inch drawing format. Features include cut and paste from a full-screen clipboard, color cycling, 16 × 16 pixel pattern capture, pattern editing and storage and a variety of drawing tools. You can scroll a full page and zoom in on your work in three magnifications. When copying, you can specify if you want a transparent or opaque copy. To title your masterpiece, you can add text in five sizes and various fonts. The package is priced lower than its competitors at $44.95. For more information, contact Accolade, 20813 Stevens Creek Blvd., Cupertino, CA 95014, 408/446-5757.

Holy Spectrum!

NewTek has broken the 32-color barrier with **Digi-Paint,** a full-featured paint program for Hold-and-Modify (4,096-color) pictures. Using the same graphics routines and dithering techniques as the company's color image capture system, Digi-View, Digi-Paint sports many new features as well. The program offers blending, tinting and smooth shading control, lasso cut-and-paste and complete drawing tools. Full screen effects include double, half size and mirror reverse. The 4,096-color dithered gradient fill and softening modes give you a natural water color or oil painting look. At $59.95, the price comes to a little over a penny per color. Send your pennies to NewTek, 115 West Crane St., Topeka, KS 66603, 800/843-8934.

1000 Into 64 Equals. . .

Why divide your attention between two computers when you can easily turn your Amiga into a C 64 with an emulator? While **The 64 Emulator** from ReadySoft is software-based, the **64-Bus** from Dynamic Software Technologies is hardware-based.

Written in 68000 Machine Code, The 64 Emulator fully supports all video modes, including sprites and raster interrupts, sound and color. If color isn't required, you can switch to monochrome mode for more speed. The Emulator supports all Amiga disk drives and printers, or you can use your 64 peripherals with an optional interface cable.

If you need 64 and 128 support, you should investigate the 64-Bus. The Bus attatches to the parallel port and lets you use your 64/128 peripherals with your Amiga. The accompanying utilites let you transfer files between 64/128 and Amiga formats. The unit will power four devices (such as three disk drives and a printer) and uses the MOUNT command.

The 64 Emulator costs $39.95, or $59.95 with the interface cable, and is available from ReadySoft Inc., PO Box 1222, Lewiston, NY 14092. The 64-Bus sells for $79.95. For more information contact Dynamic Software Technologies, 9420 Reseda Blvd. Suite #410, Northridge, CA 91324, 818/360-2995.

On the Bench

Seeking an alternative to C and Basic? Oxxi offers **Benchmark Modula-2: Software Construction Set.** The system requires no installation and includes demonstration programs and an 800-page manual. Professional developers may distribute programs written in Benchmark without any further licensing from Oxxi.

Benchmark integrates the Editor, Compiler and Linker for easier program development and debugging. The Editor, based on an EMACS editor developed at the MIT Artificial Intelligence Library, contains over 125 commands for handling multiple files, windows and buffers. The Compiler implements the entire Modula-2 language as defined by its creator, Professor Wirth. You activate the Compiler from within the Editor, which saves time debugging. Besides displaying an error message, the Editor repositions itself at first detected error so you can correct it. A key press sends the Editor to the next error. You can also link and run a program directly from the Editor.

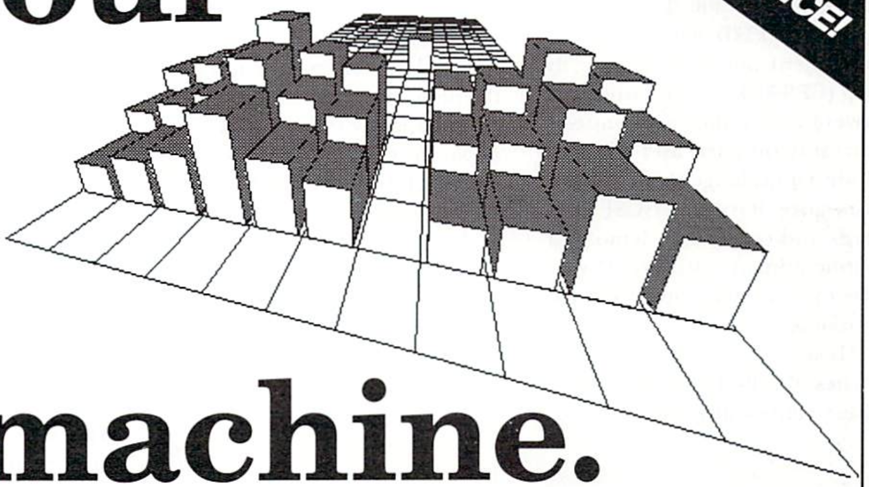
To make your programming even easier, Oxxi incorporated several libraries and utilities into Benchmark. Among the Amiga hardware and software libraries are Intuition, ROM Kernel and AmigaDOS. Standard Modula-2 libraries include FileSystem, InOut, Storage, Terminal and MathLib0. Available separately are additional libraries of standard C functions, IFF and graphics operations and simplified versions of Amiga libraries such as Screens, Windows, Gadgets, Speech and Gels. You can even cross reference between libraries with the provided utility. Other utilities determine which subroutines are used most in a program, load large numbers of files into a RAM-based disk and compile and link programs in batch mode. For hardcore programmers, an assembly language interface is also included.

The Benchmark Modula-2: Software Construction Set sells for $199, while the optional libraries are $99 apiece. For a complete list of features contact Oxxi Inc., 1835-A Dawns Way, Fullerton, CA 93631, 714/999-6710. ►

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Hard Supplies

While Commodore is expanding the Amiga line, Phoenix Electronics is expanding the individual machines. Their latest projects are 20 and 40 MB hard drives for the 500 (**PHD 500**) and 1000 (**PHD 1000**) and a replacement power supply for the 500 (**CPS-500**). All the units are covered by a one year limited warranty on parts and labor. Both Amiga-beige drives autoconfigure, have true SCSI interfaces and come with demo and public domain software. Direct Memory Access models are also available.

Measuring 12½ × 13 × 3 inches, the PHD 500 is a standalone vented unit with its own internal power supply. The drive connects to the left-hand expansion port with pass-through for further external expansion.

Approximately the same size as the 1000 itself, the fan-cooled and vented PHD 1000 sits atop the CPU. Since the drive offers internal as well as external pass through, its power supply has extra capacity to handle RAM expansion.

The PHD 500/20 retails for $949 and the PHD 500/40 for $1,399, while the PHD 1000 units sell for $969 and $1,429. The CPS-500 power supply costs $99.95. For further specifications, contact Phoenix Electronics Inc., PO Box 156, Clay Center, KS 67432, 913/632-2159.



The PHD 500 (top) and PHD 1000 hard drives.

Golden Pyramid Of Fortune

Can't get enough of TV's *Wheel of Fortune*? Micro Entertainment's **The Golden Pyramid** will help fill the empty hours between broadcasts. As in the popular game show, the object is to solve the hidden phrase (title, quotation, place, name) by choosing one letter at a time. Click on the money bar to determine the sum you'll win for guessing a correct letter. Vowels, on the other hand, you must pay for. The hidden pyramid square adds a further element of chance. Upon landing on it, you must click on a stone in the golden pyramid which could mean extra prize money or disaster. Up to five people can play at once, solving up to 15 puzzles per game. A game show host using Amiga speech controls and comments on the action. All that's missing is commercials. For $34.95, The Golden Pyramid is available from Micro Entertainment, 14 Wisteria Way, South Portland, ME 04106, 800/255-5217.

Control, Expand And Adapt

C Ltd has joined the rank of hardware developers supporting the 500 with a **SCSI Controller**, an **Internal RAM Expansion Card** and a **RGB Video Adaptor**. Similar to C Ltd's 1000 controller, the Controller 500 allows all SCSI products to communicate with the 500. The Internal RAM Expansion Card installs underneath the machine and offers 512K of memory, a built-in clock/calendar and socketed RAM chips. According to C Ltd, the board's four-layer construction gives off less noise than Commodore's RAM card. The RGB Video Adaptor lets you use a Commodore 1702 color monitor (which is often sold with Commodore 64s) with your 500. The adaptor connects through the 500's RGB port and allows 80-column display on the 1702. The SCSI Controller and the Internal RAM Expansion Card each sell for $199.95, while the RGB Video Adaptor costs $49.95. You can reach C Ltd at 723 East Skinner, Wichita, KS 67211, 316/257-6321.

A Different Tack

Batten down your Amiga and prepare to enter the **Age of Sail.** Based on naval battles of 17–19th century sailing ships, Age of Sail casts you as ship captain, grappling up to four ships, assigning boarding parties, capturing enemies and directing your gun captains in loadouts for firing shot. You provide the targets and they do the dirty work. To provide sailing accuracy even in low wind, the program allows one-degree turns and one-knot speed changes, and calculates ship positions with 64-bit accuracy. Up to 40 ship captains are allowed, and, since battles can be saved as ASCII files, you can play via modem or electronic bulletin boards. You can order Age of Sail for $39.95 (plus $3 shipping and handling) from Conflict Recreations Inc., PO Box 272, Oakdale, CT 06370.

Fast Cars and Flying Fingers

Do the squeal of tires and the smell of burning rubber make you long to be at the wheel? If so, **Ferrari Formula One** from Electronic Arts is your game. You drive a Ferrari F1/86 on 16 international racecourses in a re-creation of the 1986 Formula One schedule. Before the race you can specify its length, from 10 km to a Grand Prix, and adjust your car's tires, suspension, wing settings and turbo boost. If a full season of racing is too grueling, you can just race on your favorite track, practice on Ferrari's Fiorano Test Track or check your car's performance in the wind tunnel and on the Dynometer.

Learning to type may not be as exciting as learning to drive a Ferrari, but Electronic Arts did their best to make it as much fun. **Intelletype** offers 30 45-minute lessons, each of which is an installment in a James Bond-type thriller. Besides the story (each episode ends in a cliff-hanger hook so you'll want to continue learning), Intellitype offers you the choice of emphasizing speed, accuracy or both in your lessons. Nine categories of errors covering 27 different kinds are monitored, so you can pinpoint which skills you need to improve. The kind of error you make determines the contents of future drills.

Ferrari Formula One and Intellitype sell for $49.95 each and are published by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. ■

same result with the BOB, and then draw a simple background. Setup is now complete, and so is setup().

The getGelsInfo(), getVSprite() and getBob() routines are built to be cut out easily and used in other programs, where you can tailor them to a number of different purposes. They are presented in a more general way than necessary in this tutorial for that very reason.

The final routine in the listing is the handy close_up_shop(), which closes up and deallocates only those things that are open and allocated, using flags set in the global longword "close_mask" by setup(). It deallocates things in an inverse order from which they were allocated, as many of the structs point to other things that have to be turned off and freed before the pointing struct. Remember to note the sizes of those things you wish to free with FreeRaster() and FreeMem(). Users of Unix malloc() and free() may, like me, sometimes forget this step and end up tracking down bugs later on.

Next month we should finally "get on the move" when we tackle object movement and collision detection. ■

Please note: In this month's listing I have appended a few things to the pigs.h *include file to keep things cleaner. If you entered* pigs.h *from last month's listing, see the end of this month's listing for these changes.*

from p. 48

Listing 1. pigs.c, part 2.

```
/*-----------------------------------------------------+
 | Animation Tutorial - AmigaWorld                     |
 | Program:      pigs.c                                |
 | Author:       David T. McClellan  Sep-Oct '86       |
 |                                                     |
 | This program creates a simple animation demo with  |
 | several VSprites and a Bob moving across a          |
 | background scene. The moving objects are:  two      |
 | pigs, each consisting of two VSprites side-by-      |
 | side; one butterfly which uses one VSprite, and     |
 | one eight-color Bob.                                |
 |                                                     |
 | File: pigs2.c - setup and termination for           |
 | tutorial program.                                   |
+-----------------------------------------------------*/
/*-----------------------------------------------------+
Include Files.
Note - pigs.h includes all required Include files.
+-----------------------------------------------------*/
#include "pigs.h"
/*------+
| setup |
+------*/
/* This routine initializes the world.  It opens
libraries, sets up the screen, window, bitmaps, and
Gels, and draws the background.  If anything goes
wrong during this process, it calls close_up_shop to
deallocate all allocated memory and exits. */
setup ()
{
  int i,j;                          /* Counters */
  VUserStuff *vuse;            /* For VSprite init */
  struct RastPort *rp;
/* Open Libraries */
  if (!(GfxBase = (struct GfxBase *)
    OpenLibrary("graphics.library",1)))
      {
        printf("Cannot open graphics library\n");
        exit(1);
      }
  if ( !(IntuitionBase = (struct IntuitionBase *)
    OpenLibrary("intuition.library",1)) )
      {
        CloseLibrary(GfxBase);
        printf("Cannot open Intuition\n");
        exit(1);
      }
  close_mask = CL_GFXLIB | CL_INTLIB;
/* Allocate and initialize Custom BitMap */
  if ((bitm = (struct BitMap *)  AllocMem
       (sizeof(struct BitMap), MEMF_CHIP)) == NULL)
      {
        printf("Insufficient memory for bitmap\n");
        close_up_shop();
        exit(1);
      }
    InitBitMap (bitm, DEPTH, WIDTH, HEIGHT);
      for (i=0; i<DEPTH; i++)
    {
      if ((bitm->Planes[i] = (PLANEPTR)
      AllocRaster(WIDTH, HEIGHT)) == NULL)
      {
      for(j=0; j<i; j++)
        FreeRaster(bitm->Planes[j], WIDTH, HEIGHT);
        printf("Insufficient memory for bitmap\n");
        close_up_shop();
        exit(1);
      }
 BltClear (bitm->Planes[i], (WIDTH / 8) * HEIGHT, 1);
    }
   close_mask |= CL_BITMAP;
/* Open our screen */
   newscr.CustomBitMap = bitm;
     if ((scr = (struct Screen *) OpenScreen
                                   (&newscr)) == NULL)
       {

         close_up_shop();
         printf("Cannot open screen\n");
         exit(1);
       }
     close_mask |= CL_SCREEN;
/* Set screen's colors */
   for (i = 0, j = 2 << DEPTH; i < j; i++)
     {
       SetRGB4(&(scr->ViewPort), i, scrcolor[i].red,
               scrcolor[i].green, scrcolor[i].blue);
     }
/* Initialize and open window. Mainly needed so  */
/* we  can get CLOSEWINDOW message from user.    */
    newwin.LeftEdge = 0;
    newwin.TopEdge = 0;
    newwin.Width = WIDTH;
    newwin.Height = HEIGHT;
    newwin.DetailPen = WHITE;
    newwin.BlockPen = BLUE;
    newwin.IDCMPFlags = CLOSEWINDOW | REQCLEAR;
    newwin.Flags = WINDOWCLOSE | BORDERLESS | ACTIVATE;
    newwin.FirstGadget = NULL;
    newwin.CheckMark = NULL;
    newwin.Title = "Animated Pigs";
    newwin.Screen = scr;
    newwin.MinHeight = HEIGHT;
    newwin.MinWidth = WIDTH;
    newwin.MaxHeight = HEIGHT;
    newwin.MaxWidth = WIDTH;
    newwin.Type = CUSTOMSCREEN;
  if (!(win = (struct Window *)OpenWindow(&newwin) ))
     {
        printf("could not open the window\n");
```

```
        close_up_shop();
        exit(2);
     }
   close_mask |= CL_WINDOW;
/* Init GelsInfo struct, preparatory to setting up */
/*   VSprites and Bob.                               */
   rp = &(scr->RastPort);
   if ((GInfo = getGelsInfo (rp)) == NULL)
     /* Returns NULL if fails */
     {
       printf ("Insufficient memory to initialize
                                              Gels\n");
       close_up_shop();
       exit(3);
     }
   close_mask |= CL_GELS;
/* Allocate Pig Sprites */
  if((MyVSprites[0] = getVSprite (PIG_HEIGHT,
    VSPRITE_WIDTH, PigLeft, VSPRITE_DEPTH, PigColors,
     0, GRASSLEVEL-PIG_HEIGHT, VSPRITE)) == NULL)
     {
 printf("Insufficient memory to allocate VSprite\n");
        close_up_shop();
        exit(4);
     }
   close_mask |= CL_VSPRITES;    /* close_up_shop will
now free every VSprite ALLOCATED if error or done. */
   if((MyVSprites[1] = getVSprite (PIG_HEIGHT,
   VSPRITE_WIDTH, PigRight, VSPRITE_DEPTH, PigColors,
    16, GRASSLEVEL-PIG_HEIGHT, VSPRITE)) == NULL)
     {
       printf("Insufficient memory to allocate
                                           VSprite\n");
       close_up_shop();
       exit(4);
     }
   if((MyVSprites[2] = getVSprite (PIG_HEIGHT,
    VSPRITE_WIDTH, PigLeft, VSPRITE_DEPTH, PigColors,
    90, GRASSLEVEL-PIG_HEIGHT, VSPRITE)) == NULL)
     {
       printf("Insufficient memory to allocate
                                           VSprite\n");
       close_up_shop();
       exit(4);
     }
   if((MyVSprites[3] = getVSprite (PIG_HEIGHT,
   VSPRITE_WIDTH, PigRight, VSPRITE_DEPTH, PigColors,
   106, GRASSLEVEL-PIG_HEIGHT, VSPRITE)) == NULL)
     {
       printf("Insufficient memory to allocate
                                           VSprite\n");
       close_up_shop();
       exit(4);
     }
   if((MyVSprites[4] = getVSprite (BFLY_HEIGHT,
VSPRITE_WIDTH, Butterfly, VSPRITE_DEPTH, BflyColors,
BFLY_XFIRST, BFLY_YFIRST, VSPRITE)) == NULL)
     {
       printf("Insufficient memory to allocate
                                           VSprite\n");
       close_up_shop();
       exit(4);
     }
/* Init VUserStuff parts of each VSprite */
   for (i=0; i<4; i++)   /* Pig VUserStuff */
     {
       vuse = &(MyVSprites[i]->VUserExt);
       vuse->myflags = PIGF_RUN;
       vuse->whenx = vuse->xstart = PIG_WXRUN;
       vuse->wheny = vuse->ystart = PIG_WYRUN;
       vuse->xincr = PIG_XRUN;
       vuse->yincr = PIG_YRUN;
```

```
        vuse->my_id = i;
      }
/* Butterfly VUserStuff */
        vuse = &(MyVSprites[BFLY_ID]->VUserExt);
        vuse->myflags = 0;
        vuse->whenx = vuse->xstart = BFLY_XWHEN;
        vuse->wheny = vuse->ystart = BFLY_YWHEN;
        vuse->xincr = BFLY_XINC;
        vuse->yincr = 0;     /* Start of bfly_ys */
        vuse->my_id = BFLY_ID;
/* Add them to Gel list */
    for (i=0; i<5; i++)
        AddVSprite (MyVSprites[i], &(scr->RastPort));
        close_mask |= CL_VSPLIST;
/* Init Balloon Bob and add to Gel list */
if ((MyBob = getBob (BALL_HEIGHT, BALL_WIDTH,
    Balloon, BALL_DEPTH, BALL_PPICK, BALL_PONOFF, 0,
    BALL_Y, BALL_VFLAGS, BALL_BFLAGS)) == NULL)
    {
      printf("Insufficient memory to allocate Bob\n");
      close_up_shop();
    }
      vuse = &(MyBob->BobVSprite->VUserExt);
      vuse->whenx = vuse->xstart = BALL_XWHEN;
      vuse->xincr = BALL_XINC;
/* Note: Balloon moves only horizontally */
      vuse->wheny = vuse->ystart = vuse->yincr = 0;
      vuse->my_id = BALL_ID;
      vuse->myflags = 0;
      close_mask |= CL_BOBS;
    AddBob (MyBob, rp);
    close_mask |= CL_BOBLIST;
/* Draw Background */
/* Sky... */
    SetAPen (rp, BLUE);
/* Leave window border on */
    RectFill (rp,  0, 10, WIDTH-1, GRASSLEVEL-1);
/* Grass... */
    SetAPen (rp, GREEN);
    RectFill (rp, 0, GRASSLEVEL, WIDTH-1, HEIGHT-1);
/* Wall */
    SetAPen (rp, WHITE);
    RectFill (rp, WALL_LEFT, WALL_TOP, WALL_RIGHT,
                                            WALL_BOT);
    SetAPen (rp, BLACK);
      for (i=WALL_LEFT+10; i < WALL_RIGHT; i+=10)
        {
          Move (rp, i, WALL_BOT);
          Draw (rp, i, WALL_TOP);
        }
      for (i = WALL_TOP + 5; i < WALL_BOT; i+=5)
        {
          Move (rp, WALL_LEFT, i);
          Draw (rp, WALL_RIGHT, i);
        }
}
/*------------+
| getGelsInfo |
+------------*/
/*----------------------------------------------------+
This routine initializes the Gels subsystem, starting
up the Gel list, the collision table, and allocating
room for various other parts of the GelsInfo struct.
Requires: declaration of a routine:
                 (void) bndcol_hdlr()
for initializing collision table boundary collision
handler.
 Returns: Ptr to GelsInfo struct if setup ok,
 NULL if not.
 +---------------------------------------------------*/
  struct GelsInfo *getGelsInfo(rastp)
  struct RastPort *rastp;
{
  struct VSprite *head_dummy, *tail_dummy;
                                       /* For InitGels */
  struct GelsInfo *gp;
/* Allocate and init GelsInfo struct */
if ((gp = (struct GelsInfo *) AllocMem (sizeof(struct
 GelsInfo), MEMF_PUBLIC | MEMF_CLEAR) ) == NULL)
    {
      return (NULL);
    }
/* Get Gel list head and tail dummies */
   if ((head_dummy = (struct VSprite *) AllocMem
     (sizeof(struct VSprite), MEMF_PUBLIC |
     MEMF_CLEAR) ) == NULL)
      {
        FreeMem (gp, sizeof(struct GelsInfo));
        return(NULL);
      }
   if ((tail_dummy = (struct VSprite *) AllocMem
    (sizeof(struct VSprite), MEMF_PUBLIC |
     MEMF_CLEAR)) == NULL)
      {
        FreeMem (gp, sizeof(struct GelsInfo));
        FreeMem (head_dummy, sizeof(struct VSprite));
                 return(NULL);
      }
/* Init other GelsInfo fields */
   gp->sprRsrvd = 0xFFFF;
/* No reserved HARDWARE (simple) sprites */
/* Set aside space for the lastColor array.  This */
/* is used by the Gels system to keep track of   */
/* color definitions as VSprites modify them.    */
  if ((gp->lastColor = (WORD **) AllocMem (sizeof(
     LONG) * 8, MEMF_PUBLIC | MEMF_CLEAR)) == NULL)
      {
        FreeMem (gp, sizeof(struct GelsInfo));
        FreeMem (head_dummy, sizeof(struct VSprite));
        FreeMem (tail_dummy, sizeof(struct VSprite));
        return(NULL);
      }
/* Set aside space for nextLine array.  This is    */
used by Gels system to determine which simple
sprites are available for use for VSprites by
scanline (y coordinate). As the image for a
VSprite is finished on the screen, the simple
sprite used for it again becomes available, &
the Gels system remembers that here. /*
   if ((gp->nextLine = (WORD *) AllocMem (sizeof
                                         (WORD) * 8,
     MEMF_PUBLIC | MEMF_CLEAR)) == NULL)
      {
        FreeMem (head_dummy, sizeof(struct VSprite));
        FreeMem (tail_dummy, sizeof(struct VSprite));
        FreeMem (gp->lastColor, sizeof(LONG) * 8);
        FreeMem (gp, sizeof(struct GelsInfo));
        return(NULL);
      }
/* Set up space and init collision routine */
/*   table, used by Gels system to detect  */
/*   collisions between Gels and Gels or   */
/*   Gels and the border.                  */
/*   The table is used when VSprites have  */
/*   HitMask set.                          */
  if ((gp->collHandler = (struct collTable *)
    AllocMem (sizeof(struct collTable),
    MEMF_PUBLIC | MEMF_CLEAR)) == NULL)
      {
        FreeMem (head_dummy, sizeof(struct VSprite));
        FreeMem (tail_dummy, sizeof(struct VSprite));
        FreeMem (gp->lastColor, sizeof(LONG) * 8);
        FreeMem (gp->nextLine, sizeof(WORD) * 8);
        FreeMem (gp, sizeof(struct GelsInfo));
        return(NULL);
      }
/* Init boundary for boundary collision detection */
/* - Gels impacting background edges.*/
   gp->leftmost = 0;
   gp->rightmost = (rastp->BitMap->
```

```
                        BytesPerRow * 8) - 1;
   gp->topmost = 0;
   gp->bottommost = rastp->BitMap->Rows - 1;
   rastp->GelsInfo = gp;/* Point the RastPort at our
                    initialized GelsInfo struct. */
   InitGels (head_dummy, tail_dummy, gp);
/* Init collision table with our stub handler.   */
/*   Caller will tie its own in here when ready. */
   SetCollision (0, bndcol_hdlr, gp);
   WaitTOF(); /* Wait until at Top-of-Frame to
return, so caller will have a system ready to
add Gels to.   */
   return(gp);
} /* end getGelsInfo */
/*-----------+
| getVSprite |
+-----------*/
/* This routine initializes a VSprite. Simplifies
setup Caller has to fill in VUserStuff part and call
AddVSprite itself.  It can also set up the VSprite
part of a Bob (which is why v_words and imagedepth
are required. */
struct VSprite *getVSprite (v_height, v_words,
         v_image, v_depth, v_colors, x0,y0, v_flags)
   int v_height;   /* Height of VSprite */
   int v_words;    /* Width of VSprite in words.
         1 for VSprites, possibly more for Bobs. */
   WORD v_image[];   /* Image array. */
   int v_depth; /* Depth of image in bitplanes.
For VSprite, 2 always; more or less for Bob.      */
   WORD *v_colors; /* Color set for VSprite. */
   int x0,y0; /* Initial x,y position of VSprite. */
   int v_flags; /* VSprite flags. */
{
   struct VSprite *vsp; /* Ptr to allocated VSprte */
/* Allocate and init the VSprite */
   if ((vsp = (struct VSprite *) AllocMem (sizeof
 (struct VSprite),MEMF_PUBLIC | MEMF_CLEAR)) == NULL)
     {
       return (NULL);
     }
/* Init parameterized elements */
   vsp->Height = v_height;
   vsp->Width = v_words;
   vsp->X = x0;
   vsp->Y = y0;
   vsp->ImageData = v_image;
   vsp->Depth = v_depth;
   vsp->SprColors = v_colors;
   vsp->Flags = v_flags;
/* Init other parts */
/* Set HitMask and MeMask to border collision */
/* detection - lowest order bit.  Bits 1-15 */
/* are used in masks to determine inter-Gel */
/* collisions - MeMask is VSprite's own     */
/* type; HitMask is who it can bump into &  */
/* cause a collision. */
   vsp->MeMask = 1;
   vsp->HitMask = 1;
/* Setup boundary collision mask space. */
   if ((vsp->BorderLine = (WORD *) AllocMem
   (sizeof(WORD) * v_words, MEMF_PUBLIC |
                      MEMF_CLEAR)) == NULL)
  {    /* No more room. Free VSprite, return */
      FreeMem (vsp, sizeof(struct VSprite));
   return (NULL);
  }
   if ((vsp->CollMask = (WORD *) AllocMem
   (sizeof(WORD) * v_words * v_height, MEMF_CHIP
            | MEMF_CLEAR)) == NULL)
     { /* No more room. Free VSprite, return */
     FreeMem (vsp->BorderLine, sizeof(WORD)
```
►

```
                                        * v_words);
      FreeMem (vsp);
      return (NULL);
    }
vsp->PlanePick = 0; /* This and next used by Bobs */
vsp->PlaneOnOff = 0; /* Null out for VSprites.    */
caller builds a Bob, it will reset them.  */
     InitMasks(vsp);
/* Calculate collision masks for VSprite.*/
     return (vsp);
} /* end getVSprite */

/*-------+
| getBob |
+-------*/
/* This routine allocates and initializes a Bob. It
uses getVSprite, above, to set up the Bob's VSprite.
Returns:  ptr to Bob if successful, NULL if fail. */
struct Bob *getBob (b_height, b_width, b_image,
  b_depth, plane_pick, plane_onoff,  x0,y0, v_flags,
   b_flags)
   int b_height;  /* Height of Bob in pixels */
   int b_width;   /* Width of Bob in pixels */
   WORD b_image[];/* Image data in bit plane form */
   int b_depth;  /* Number of bit planes in image */
   int plane_pick; /* PlanePick bits */
   int plane_onoff; /* PlaneOnOff bits */
   int x0,y0;   /* Bob initial coordinates */
   int v_flags; /* VSprite flags */
   int b_flags; /* Bob flags */
{
   struct Bob *robert; /* The Bob */
   struct VSprite *vsp; /* Its VSprite */
   SHORT b_words; /* Width of Bob, in words */
/* Allocate and init Bob */
   b_words = (b_width + 15) / 16;
/* Words wide Bob is, rounded up.       */
   if ((vsp = getVSprite (b_height, b_words, b_image,
             b_depth, NULL, x0,y0, v_flags)) == NULL)
   {
     return (NULL);
   }
   vsp->PlanePick = plane_pick;
   vsp->PlaneOnOff = plane_onoff;
   if ((robert = (struct Bob *) AllocMem (sizeof
     (struct Bob),MEMF_PUBLIC | MEMF_CLEAR)) == NULL)
   {
     FreeMem (vsp->CollMask, sizeof(WORD) *
                           vsp->Width * vsp->Height);
     FreeMem (vsp->BorderLine, sizeof(WORD) *
                           vsp->Width);
     FreeMem (vsp, sizeof(struct VSprite));
     return(NULL);
   }
   vsp->VSBob = robert;
   robert->BobVSprite = vsp;
   robert->Flags = b_flags;
   robert->ImageShadow = vsp->CollMask;
        /* For overlaying */
   robert->Before = robert->After = NULL;
        /* Let caller order Bobs */
/* Allocate background save buffer */
  if ((robert->SaveBuffer = (WORD *) AllocMem (sizeof
    (SHORT) * b_words * b_height * b_depth, MEMF_CHIP
    | MEMF_CLEAR)) == NULL)
      {
        FreeMem (vsp->CollMask, sizeof(WORD) *
                           vsp->Width * vsp->Height);
        FreeMem (vsp->BorderLine, sizeof(WORD) *
                           vsp->Width);
        FreeMem (vsp, sizeof(struct VSprite));
        FreeMem (robert, sizeof(struct Bob));
        return(NULL);

      }
/* Misc. initialization */
```

```
robert->BobComp = NULL;

/* Not part of AnimComp. Caller can change this.   */

        robert->DBuffer = NULL; /* Not double buffered
     unless caller changes this.*/
        return (robert);
     }
/*---------------+
| close_up_shop |
+---------------*/
/* Clean up and deallocate memory routine */
close_up_shop()
{
   int i;
   struct VSprite *vsp;
   if (close_mask & CL_BOBLIST)
RemIBob (MyBob, &(scr->RastPort), &(scr->ViewPort));
   if (close_mask & CL_BOBS)
   {
     vsp = MyBob->BobVSprite;
     FreeMem (MyBob->SaveBuffer, sizeof(SHORT) *
             vsp->Width * vsp->Height * vsp->Depth);
     FreeMem (vsp->CollMask, sizeof(WORD) *
             vsp->Width * vsp->Height);
     FreeMem (vsp->BorderLine, sizeof(WORD) *
              vsp->Width);
     FreeMem (vsp, sizeof(struct VSprite));
     FreeMem (MyBob, sizeof(struct Bob));
   }
   if (close_mask & CL_VSPLIST)
/* Remove VSprites from Gel list */
     for (i = 0; i < 5; i++)
       RemVSprite (MyVSprites[i]);
   if (close_mask & CL_VSPRITES)
       for (i = 0; i< 5; i++)
       {
         if ((vsp = MyVSprites[i]) != NULL)
         {
           FreeMem (vsp->CollMask, sizeof(WORD) *
                    vsp->Width * vsp->Height);
           FreeMem (vsp->BorderLine, sizeof(WORD) *
                    vsp->Width);
           FreeMem (vsp, sizeof(struct VSprite));
         }
       }
   if (close_mask & CL_GELS)
     {
       FreeMem (GInfo->collHandler, sizeof(struct
                collTable));
       FreeMem (GInfo->gelHead, sizeof(struct
                VSprite));
       FreeMem (GInfo->gelTail, sizeof(struct
                VSprite));
       FreeMem (GInfo->lastColor, sizeof(LONG) * 8);
       FreeMem (GInfo->nextLine, sizeof(WORD) * 8);
       FreeMem (GInfo, sizeof(struct GelsInfo));
     }
   if (close_mask & CL_WINDOW)
     CloseWindow (win);
   if (close_mask & CL_SCREEN)
     CloseScreen (scr);
   OpenWorkBench();
/* Make sure WB open when we're done */
   if (close_mask & CL_BITMAP)
   {
     for(i=0; i<DEPTH; i++)
     FreeRaster(bitm->Planes[i], WIDTH, HEIGHT);
     FreeMem (bitm, sizeof(struct BitMap));
   }
   if (close_mask & CL_INTLIB)
     CloseLibrary (IntuitionBase);
   if (close_mask & CL_GFXLIB)
```
►

```
    CloseLibrary (GfxBase);
} /* end close_up_shop */

/* end pigs.c part 2 */
```

Listing 2. pigs.h include file.

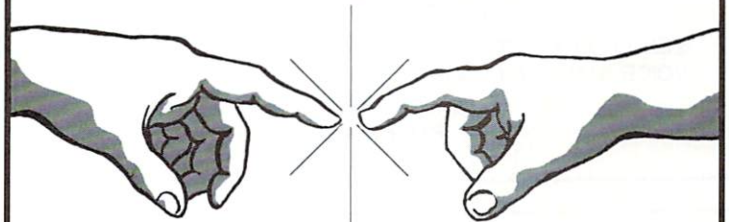
```
/* pigs.h--include file for tutorial program. */
/* Amiga Include Files */
#include <exec/types.h>
#include <exec/exec.h>
#include <devices/console.h>
#include <devices/timer.h>
#include <graphics/gfx.h>
#include <graphics/clip.h>
#include <graphics/view.h>
#include <graphics/rastport.h>
#include <graphics/layers.h>
#include <graphics/regions.h>
#include <graphics/copper.h>
#include <graphics/display.h>
#include <graphics/collide.h>
#include <intuition/intuition.h>
/*
The VSprite struct declaration in gels.h has a user-
definable structure as its last element.  If the
word VUserStuff is #defined before gels.h is in-
cluded, the struct it is defined to be will be
used as that user-defined final element.  The
struct my_Vinfo, below, serves that purpose; and
allows each VSprite to carry information I need
in my collision handler and object movement code. */

struct my_Vinfo {
   short myflags;
/* Direction for Butterfly, in or out of jump mode
for pig. The following 6 elements allow me to move
the VSprite at integral velocities in fractions or
multiples of screen refresh rate without using
floating pt math. */
   short whenx, wheny;      /* Increment VSprite x,y
                    when this  decrements to 0).  */
   short xstart,ystart;  /* whenx, wheny reset values
after hits 0 (3 = one move each 3 frames) */
    short xincr, yincr;     /* Increment for x and y
each time whenx,wheny hit 0. For Butterfly, yincr is
used as index into bfly_ys array (below), to give
butterfly variable y movement. */
   short my_id;       /* Used to distinguish VSprites
when collision handler gets called with one. */
};
/*The following define lets me to overlay the default
definition of VUserStuff in gels.h with my own.    */
#define VUserStuff struct my_Vinfo
#include <graphics/gels.h>
/*   General Defines and Macros   */
/* Screen Sizes */
#define WIDTH  320    /* Width of screen in pixels */
#define HEIGHT 200   /* Height of screen in pixels */
#define DEPTH  3  /* Bitplane depth: 3 == 8 colors */
/* Useful VSprite Constants */
#define VSPRITE_DEPTH    2
               /* No. of Bitplanes used in VSprite */
#define VSPRITE_WIDTH    1
                /* No. of words wide a VSprite is */
/*  Background Locations */
#define GRASSLEVEL  190
                /* Y offset of top of "grass" area */
#define WALL_LEFT    180
                 /* Start X of wall pigs jump over */
#define WALL_RIGHT  210           /* End X of wall */
#define WALL_BOT     GRASSLEVEL   /* Bottom of wall */
#define WALL_TOP     (WALL_BOT - 20) /* Top of wall */
/* Close-up-shop Bits */
/* Given that we might run out of memory at any point
during setup, the setup routine keeps track of what
has been opened and initialized via the following
```

```
bits and the long int close_mask; the close_up_shop
routine will free/close only those things whose bits
are on. */
#define CL_GFXLIB  0x0001 /* Free graphics library */
#define CL_INTLIB  0x0002   /* Free Intuition lib. */
#define CL_SCREEN  0x0004            /* Close screen */
#define CL_BITMAP  0x0008            /* Free BitMaps */
#define CL_WINDOW  0x0010            /* Close window */
#define CL_GELS    0x0020   /* Free GelsInfo stuff */
#define CL_VSPRITES 0x0040          /* Free VSprites */
#define CL_VSPLIST  0x0080
                 /* Remove VSprites from Gel list */
#define CL_BOBS     0x0100              /* Free Bobs */
#define CL_BOBLIST  0x0200
                     /* Remove Bobs from Gel list */
extern unsigned long close_mask;  /* Mask used by
         close_up_shop to decide what to close.    */
/* Library Pointers */
extern struct IntuitionBase *IntuitionBase;
extern struct GfxBase *GfxBase;
/* Screen/Window info */
extern struct NewScreen newscr;
extern struct Screen *scr; /* Real screen, from
                                     OpenScreen */
extern struct BitMap *bitm; /* Custom bitmap
                                        storage */
extern struct NewWindow newwin; /* Real window,
                                from OpenWindow*/
extern struct Window *win;
extern struct IntuiMessage *message; /* For getting
    messages from Intuition, such as CLOSEWINDOW */
extern struct GelsInfo *GInfo; /* for InitGels */
extern struct color4 {
        WORD red;         /* Red component of color */
        WORD green;     /* Green component of color */
        WORD blue;       /* Blue component of color */
} scrcolor[8];                /* Screen main colors */
/* Indices of colors to be put in scrcolor */
#define BLUE            0            /* Blue's index */
#define BLACK           1
#define WHITE           2
#define YELLOW          3
#define GREEN           4
#define GREY            5
#define RED             6
#define ORANGE          7
/* VSprites and Related Info */
/* Pig Constants */
#define NPIGS              2    /* pigs in animation */
#define SPRITES_PER_PIG  2     /* VSprites per pig */
#define PIG_WIDTH      32        /* 2 VSprite widths */
#define PIG_MIDDLE     16
#define PIG_HEIGHT     11     /* Pig height in pixels */
#define PIG_WXRUN      1       /* Incr x every frame. */
#define PIG_WYRUN      1              /* Ditto for y. */
#define PIG_XRUN       1 /* Dist. Pig runs each incr */
#define PIG_YRUN      -1 /* Pig has a hopping sort of
         run, 1 pixel one frame, down 1 the next. */
/* Wall is just under 2 pig-heights. Scale jump so
pig starts one pig-width away and rises above wall.
Jump is actually a triangle; if I were more realistic
I would pre-calculate & store a parabola; but a tri-
angle is cheap with integer math and close enough. */
#define JUMP_BEGIN  (WALL_LEFT - (PIG_WIDTH * 1))
#define JUMP_MID    WALL_RIGHT-5  /* Start of Fall */
/* Defines for VUserStuff part of VSprite */
#define PIG_WXJUMP  1 /* Incr x once/frame on jump */
#define PIG_WYJUMP  1   /* Incr y every frame on jump
   pig will rise at half the rate it goes forward. */
#define PIG_XJUMP    1     /* Distance Pig goes forward
                                  on Jump per frame. */
#define PIG_YUP    -1              /* Rate of Rise. */
#define PIG_YDOWN   1              /* Rate of Fall. */
#define PIGF_RUN    0          /* If Pig's
 VSprite.VUserExt.myflags is this, pig is running. */
#define PIGF_RISE    1     /* If Pig's myflags is this,
                              pig is rising in jump. */
#define PIGF_FALL    2     /* If Pig's myflags is this, ▶
```




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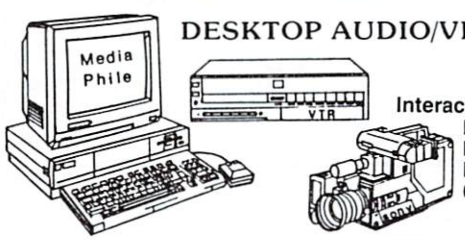
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```
    pig is is falling from mid jump height. Otherwise,
                                     pig is running. */
/* Butterfly Constants */
#define BFLY_WIDTH   16          /* One VSprite wide */
#define BFLY_HEIGHT   9   /* Butterfly pixel height */
#define BFLY_XFIRST  50          /* Initial Position */
#define BFLY_YFIRST 100
/* Defines for VUserStuff part of Butterfly */
#define BFLY_XWHEN   1          /* X Move every frame */
#define BFLY_YWHEN   2    /* Y move every other frame;
                                 see bfly_ys below. */
#define BFLY_XINC    1 /* Move one pixel each when */
#define BFLY_CYCLE  16
/* The VSprites themselves */
/* 2 Pigs, left and right parts each; 1 ButterFly.
    The Balloon Bob keeps its VSprite separately.  */
extern struct VSprite *MyVSprites[5];
#define PIG1L_ID  0       /* VSprite index, left side,
                                                Pig1 */
#define PIG1R_ID  1              /* Pig 1, right side */
#define PIG2L_ID  2               /* Pig 2, left side */
#define PIG2R_ID  3              /* Pig 2, right side */
#define BFLY_ID   4      /* Butterfly VSprite index */
/* Bob and related info. */
/* Balloon Constants */

#define BALL_WIDTH   32          /* Height of Balloon */
#define BALL_HEIGHT  24
#define BALL_DEPTH    3               /* Up to 8 colors */
#define BALL_Y       40 /* Y offset of Balloon top */
#define BALL_PPICK   0x03      /* Balloon PlanePick */
#define BALL_PONOFF  0x03     /* Balloon PlaneOnOff */
#define BALL_BFLAGS  0    /* No Bob flags for Balloon
                                                 Bob */
#define BALL_VFLAGS  SAVEBACK | OVERLAY     /* VSprite
  flags for Bob - save background, use ImageShadow to
                            determine what to overlay. */
#define BALL_ID       5    /* Balloon Bob's VSprite id,
                             for collision detection. */
/* Balloon's VSprites VUserStuff defines */
#define BALL_XWHEN 1                /* Move every frame */
#define BALL_XINC  2 /* Moves this much each frame */
#define BALL_MAXSPEED   15  /* Maximum balloon speed,
                                        pixels/frame. */
#define BALLF_SPEED    0  /* Balloon is speeding up */
#define BALLF_SLOW     1 /* Balloon is slowing down */
extern short bfly_ys[BFLY_CYCLE];
extern WORD PigColors[];
extern WORD BflyColors[];
extern WORD PigLeft[];
extern WORD PigRight[];
extern WORD Butterfly[];
extern WORD Balloon[];
extern struct Bob *MyBob;

/* Function declarations, so the C compiler doesn't
think they return ints.                            */
/* Amiga Functions */
extern long ReplyMsg();
extern long Wait();
extern long Request();
extern long CloseLibrary();
extern long CloseWindow();
extern struct Screen *OpenScreen();
extern struct Window *OpenWindow();

/* My own functions which need forward declarations */
struct GelsInfo *getGelsInfo();
/* Init GelsInfo struct and Gel system. Returns ptr to
   a GelsInfo struct if setup went ok, NULL if not. */
struct VSprite *getVSprite();
/* My make-a-VSprite routine.  Returns ptr to VSprite
   or NULL if no room to allocate one. */
struct Bob *getBob();  /* Make-a-Bob routine. Returns
     ptr to Bob or NULL if no room to allocate one. */
void bndcol_hdlr();   /* Handles boundary collisions.
                            Needed by getGelsInfo.  */
/*----- End PIGS.H --------------------------------*/
```

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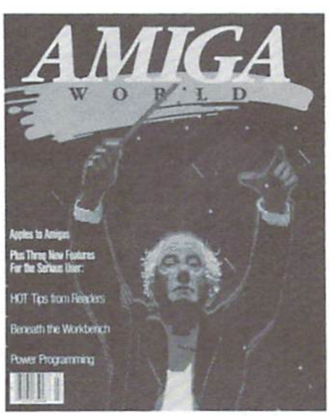
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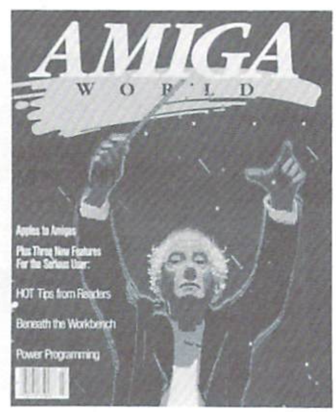
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